VOL. XXI NEW YORK—THURSDAY, SEPTEMBER 9, 1909—CHICAGO No. 11

THE AUTOMOBILE

LOWELL'S CARNIVAL SUCCESSFULLY INAUGURATED

In front of Official Headquarters

Where the Contestants Weighed In

Crowd which Packed the Stands

LOWELL TROPHY—318 MILES

HOW THEY FINISHED

Finish	Driver	Car	Time
1	Robertson	Simplex	5:52:01 2/5
2	Poole	Isotta	6:13:37 1/5
3	Parker	Fiat	6:22:21 3/5
4	Burman	Buick	6:25:44
5	Basle	Renault	6:36:47 2/5

LOWELL, MASS., Sept. 8—George Robertson to-day again made clear his right to the American speed championship by his hard-fought victory in the National Stock Car Championship. His Simplex car, the same one which had seen much service in 24-hour races, covered the 318 miles necessary to win the Lowell cup in 5 hours 52 minutes 1 2-5 seconds, at a speed which averaged 54.2 miles an hour. After many vicissitudes at the start, Robertson seemed to have a good lead at the two-thirds mark. Shortly after that point, however, Grant and his Alco began to creep up. Robertson secured a little more lead in the twenty-seventh round, but in the twenty-eighth ignition troubles fell heavily on him and he had to allow his rival to take the lead. Stopping at the pits, he changed spark plugs, consuming in all four minutes. And, then, when Grant had success almost in his grasp, he met with misfortune. One of his tires blew out on the hair-pin turn, and almost at the same time a driving chain broke. He was compelled to look on idly while Robertson dashed past into his former position, and while Poole, Parker, Burman and Basle took the remaining places. The two Knoxes, the American and the Lozier were still running when Referee Hower declared the race at an end. The many thousand spectators went home much pleased with the racing, but disappointed at not having seen the Presidential box occupied by one

Starter Wagner-President Speare

Officials Who Faithfully Performed Their Arduous Duties

McMurtry, Edwards, Beecroft

William Howard Taft. The President's absence was the sole disappointing feature of the day, and one which no one has been able to explain satisfactorily. Although he had not actually promised to attend, his well-known liking for the sport and the nearness of Beverly made the supposition lie strongly in that direction.

All Was Activity as the Big Cars Started

Sixteen cars assembled soon after nine o'clock in the official avenue between the grandstand and the press stand. The scenes for the hour following were infectiously animating in the crisp Autumn air, tempered by the rays of Old Sol showered from a cloudless sky. Gradually the enormous grandstand accumulated its load of humanity. The fair sex supplied artistic costumes in generous quantity, displaying all the colors of the rainbow, and a few never seen in nature. The music of the band chimed with the roaring exhausts of the impatient speed craft, which the energetic Wagner was arranging in two lines with the skill gained by long experience. President Heinze, of the Lowell Automobile Club, who has been active in all the preparations, looked on with an anxious eye, praying that the day would end without accident of any sort. Now and then he glanced in the direction from which the Chief Executive of the United States might appear, for the assurance had been fairly positive that President Taft would drive over in his car from the Summer capital at Beverly. The presidential box had been prepared, and its tenantless condition told a story of expectancy.

Bent upon their various duties, President L. R. Speare of the A. A. A. and Chairman F. B. Hower of the Contest Board circulated in the stretch, from which occasionally the clear-voiced Prunty made an announcement. Stevens, Wright, Webb, Broadwell and others of some degree in the affair were in evidence.

As the hour for the start approached there was great dismay in the Buick camp, for Strang, the winner of many previous contests, who had drawn number one, had not appeared. Ten o'clock came, and still no word or sight of the speedy Buick. So it was that the first to face Starter Wagner was Drach with the low-hung American, its number "2" standing out boldly on the big square hood. It leapt away at the word with a roar and a cloud of blue smoke, and Hughes, the plucky driver of the Allen-Kingston, brought his machine to the line. The others got the word at 30-second intervals; No. 4 Buick, Burman, No. 5 Alco, Grant; No. 6 Isotta, Poole; No. 7 Fiat, Parker; No. 8 Knox, Belcher; No. 10 Knox, Shaw; No. 11 Fiat, De Palma; No. 12 Simplex, Robertson; No. 14 Knox, Downey; No. 15 Stoddard-Dayton, Shaw; No. 16 Apperson, Lytle; No. 17 Buick, Chevrolet; No. 18 Lozier, Cobe, and No. 19 Renault, Basle.

Robertson of Vanderbilt Cup fame called forth the plaudits of the crowd, and Lytle, Chevrolet, Grant, Poole and De Palma were not strangers to the enthusiastic fans. Strang's failure to start caused much disappointment, as he won the races here last year when he was driving an Isotta. Racing Manager Pickens of the Buick team later received word that Strang, *en route* to the starting line, had come in violent contact with a telegraph pole and had bent his front axle. However, he succeeded in making repairs, and later appeared on the course. All the other entrants, except those who had previously been scratched, appeared and got away in good shape.

STORY OF THE LOWELL TROPHY RACE BY LAPS

First Lap—All cars survived the opening lap, with Buick, Burman, passing Allen-Kingston, Hughes, and Knox, Shaw, falling back two places. Buick, Chevrolet, made the fastest circuit, its time being 10:41, and by this performance moved up two places. Otherwise there were no changes.

Second Lap—Now the changes came thick and fast. Chevrolet had the best of it in time, which meant that he was in the lead, with Lytle only a second behind.

Third Lap—Robertson forged to the front during this round, his figures for the total being 32:14, with Burman next in 32:38. Chevrolet had gone to the bad, just finishing the lap with a broken frame. No. 3 Allen-Kingston stopped for tires.

Fourth Lap—Robertson retailed his lead, with Burman still in pursuit. Soon after the latter passed Strang unexpectedly appeared and passed the starting point, apparently having repaired his damaged car. He started with a 45-minute handicap.

Fifth Lap—Robertson and Lytle were the chief contenders, with the Simplex timed at 53:43 and the Apperson at 53:56. Burman was third in 54:34, with Grant less than a minute behind.

Sixth Lap—Fourteen seconds separated Robertson and Lytle on this round, with Grant third and Burman apparently in trouble.

Seventh Lap—Only eight seconds intervened between Robertson and Lytle, and the fight could not have been prettier. One second over a minute behind was Grant and the Alco.

Eighth Lap—Lytle got past Robertson and the Jack Rabbit had nine seconds advantage on the round. Grant remained in third place.

Ninth Lap—Just half a minute represented Lytle's lead over Robertson, with Grant still hugging third over a minute behind.

Tenth Lap—Tire troubles on the backstretch caused Lytle to lose his lead, and when he came around to the pits, he took on two spare shoes. Of course Robertson moved up, his margin becoming ten minutes less ten seconds. Grant could not help advancing a notch. The Simplex had averaged 58.8 miles an hour for the 106 miles traveled.

Eleventh Lap—This proved to be an unfortunate round, for two contenders joined the down-and-outers, Lytle's Apperson suffering from a broken camshaft and Shaw's Stoddard-Dayton from a damaged axle. Chevrolet's Buick and Belcher's Knox had already disappeared. Thus there were thirteen of the original seventeen still in the running.

Twelfth Lap—With Lytle out of the reckoning, Robertson increased his lead over Grant. Parker's Fiat was in third place less than a minute ahead of Poole's Isotta.

Thirteenth Lap—Robertson's speed now showed an average of 58.3 miles an hour, and he had over three minutes lead on Grant, who in turn led Poole by about five minutes. Parker had his troubles in this round, coasting to the pits with a fire aboard from an overflow of oil. This was extinguished with little damage, but he had lost his good position.

Fourteenth Lap—Robertson had added to his advantage until it totaled 4 minutes 35 seconds, with Grant six minutes ahead of De Palma, and Poole eight minutes behind the Fiat pilot.

Fifteenth Lap—Robertson lengthened the gap by nearly three minutes more. De Palma drew closer to Grant, and Poole installed himself comfortably in fourth place.

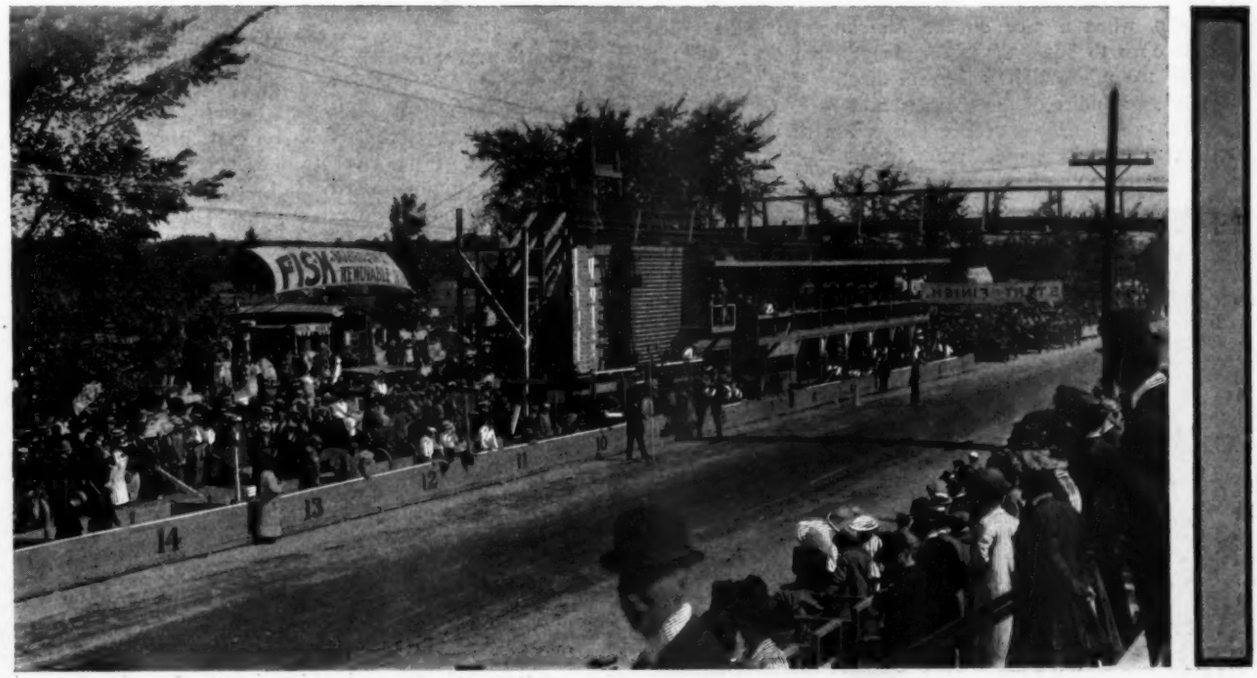
Sixteenth to Twentieth Laps—Robertson stopped for supplies all round at the conclusion of this lap. At this time, he had a lead of 9 minutes 52 seconds on Grant's Alco. Grant had lost ground until his lead over De Palma's Fiat was but ten seconds. Poole still held the fourth notch.

Twenty-first to Twenty-fifth Laps—In the twenty-first lap Robertson's margin was but 1 minute 1 second, and Grant had bettered his position materially. De Palma held fast to third, and Poole and Burman were fourth and fifth respectively. In the next lap, Grant hauled up on Robertson until he was only 55 seconds behind. Again in the twenty-third lap Grant climbed still further and cut off three more seconds of the lead, and in the next cut off five more. De Palma was 7 minutes 25 seconds behind Grant. At this point the Allen-Kingston hit a tree at the hair-pin turn and retired. Robertson completed his twenty-fifth lap in 4:46:37, increasing his lead on Grant to 55 seconds.

Twenty-sixth to Thirtieth Laps—In the twenty-sixth Grant continued to gain and in the twenty-seventh got past Robertson and opened up a lead of 3 minutes 25 seconds. With this he seemed to have the race well in hand, but at the hair-pin turn his chain broke and a tire came off. Robertson again took the lead, finishing his twenty-eighth lap in 5:24:48. The contest then slackened, for De Palma, now the runner-up, was 7 minutes 25 seconds behind the leader. The Isotta was half an hour behind. Beginning his last lap, Robertson could hardly have lost. At 3:58 he dashed past the grandstand the winner, in the time of 5:52:01 2-5. He had lapped the De Palma Fiat, which had just stopped at the pits to change spark-plugs and take on water. De Palma made his twenty-nine laps in 5:54:26, and seemed to have second place cinched, but on his last lap he was delayed and it cost him the place. Poole's Isotta broke into second in 6:13:37 1-5. Parker finished third and Burman and the Buick fourth. Basle and his Renault, a famous 24-hour race champion, could do no better than fifth. The times of Parker and the Fiat, Burman and the Buick, and Basle were 6:22:21 2-5, 6:25:44, and 6:36:47 2-5, respectively. Knox No. 10 was still running on its 28th lap when the contest was called off, and American No. 2, Knox No. 14, and Lozier No. 18 were on the 26th lap at the flag.

TABULAR STORY OF THE LOWELL TROPHY RACE

No.	Car	Driver	First Lap	Tenth Lap	Twentieth Lap	Finish
12	Simplex	Robertson	10:33	1:48:36	3:43:09	5:52:01
6	Isotta	Poole	11:47	1:53:11	4:04:40	6:13:37
7	Fiat	Parker	11:38	1:52:58	4:22:05	6:22:21
4	Buick	Burman	11:05	2:17:10	4:10:32	6:25:44
20	Renault	Basle	12:03	2:05:33	4:20:38	6:36:47
11	Fiat	De Palma	11:01	1:58:48	3:53:11	
5	Alco	Grant	10:53	1:49:48	3:53:01	
10	Knox	Shaw	12:34	2:19:12	4:37:59	
18	Lozier	Cobe	11:36	2:57:48	5:11:21	
2	American	Drach	10:47	2:34:45	5:16:21	
14	Knox	Downey	12:23	2:36:20	5:40:15	
1	Buick	Strang	56:23	2:42:17		
3	Allen-Kingston	Hughes	11:39	2:57:37	Out in 23d.	
16	Apperson	Lytle	10:57	1:50:26	Out in 11th.	
15	Stoddard-Dayton	Shaw	12:15	1:56:30	Out in 11th.	
17	Buick	Chevrolet	10:41			
8	Knox	Belcher	11:30			



Ample Width of Stretch and Notable Detail in Arrangement Were Features That Made the Carnival Memorable

Michelin Tire Camp Had a Big Force of Experts

SPECIFICATIONS OF CARS IN THE BIG RACE

CLASS 1—DISPLACEMENT, 451-600

No.	Car	Driver	Mechanic	W'ght	Bore	Stroke	Dis-placement
1	Buick	Strang	Larsnauer	2,405	4.5	5.0	318.0
2	American	Drach	Kachline	2,985	5.75	5.5	571.3
3	Allen-Kingston	Hughes	Dustan	3,115	5.5	6.0	570.2
4	Buick	Burman	Grennon	2,440	4.5	5.0	318.0
5	Alco 6-Cylinder	Grant	Lee	2,975	4.73	5.52	578.2
6	Isotta-Fraschini	Poole	Anderson	2,805	5.71	4.73	483.1
7	Fiat	Parker	Scudellary	2,895	....	....	.....
8	Knox	Belcher	Jahn	2,370	5.0	4.75	373.2
10	Knox	Shaw	Winton	2,317	5.0	4.75	373.2
11	Fiat	De Palma	Pozzo	2,760	....	....	.....
12	Simplex	Robertson	Ethridge	3,095	5.75	5.75	597.3
14	Knox	Downey	Feinberg	2,730	5.5	5.5	522.7
15	Stod.ard-Dayton	Shaw	Hart	2,595	5.25	5.75	498.0
16	Arperson	Lytle	Bates	2,730	5.75	5.75	597.3
17	Buick	Chevrolet	Nelson	2,440	4.5	5.0	318.0
18	Lozier 6-Cylinder	Cobe	Horan	3,415	4.62	5.5	554.4
20	Renault	Basle	De Mand	2,740	5.12	5.52	451.6

PROGRAM TO CONCLUDE CARNIVAL

Although the automobile races on Monday, Tuesday, and Wednesday form the most spectacular part of the week's events, they are not by any means the only ones on which the citizens of Lowell rely for the success of their carnival. There are other events which to many will be even more interesting than the spectacular contests of the racing automobiles. The devotees of motor boating will have their especial day on Thursday, September 9, when a race on the Merrimac River is scheduled. This is open to boats of 30 feet length and over, and the distance is 100 miles. The race will start at the pontoon bridge.

Friday, a number of motorcycle races will be conducted under the rules and auspices of the Federation of American Motorcyclists, on the automobile race circuit.

Matson Breaks in a Young and Promising Driver

LOWELL—THE CARNIVAL CITY

By John A. McKenna, Sec.-Treas. Lowell Automobile Club

The city of Lowell has no Revolutionary history, although it is situated in the historic old county of Middlesex. It occupies a territory set apart at various times from the towns of Chelmsford, Dracut, and Tewksbury. The vertebrae column of the "Spindle City" is the mile of brick cotton factories that line one bank of the Merrimac River. It really got its backbone before the rest of the body politic developed; and to-day, when a municipality of 100,000 people has grown about the mills, the cotton factories remain one of the sights of the city. Visitors who desire to inspect such mills as are in operation can do so by applying at the counting rooms for a guide. While certain of the secret processes of manufacture are guarded, corporation officials are always willing to admit strangers within their walls.

Persons interested in manufacturing will also find the Lowell Textile School well worthy of inspection, and members of the faculty will be glad to explain the several branches of cotton, woolen, and chemistry that are taught there. The institution stands upon a commanding location beside the Merrimac River, just beyond the Moody street bridge, and is but a short distance from the entrance to the boulevard. It was founded by the State, and receives annual grants from the State and the city, but has also received large gifts through private generosity. It ranks as the most complete textile school in the country.

On Pawtucket street, three minutes' walk from the Pawtucket bridge, is the old Spaulding House, occupied as a clubhouse by the Daughters of the American Revolution, who have restored it upon its original lines. This was a tavern at the beginning of the last century, and is an excellent example of the architecture of that period. Another interesting old house that has been restored recently is the building in Worthen street, occupied by the Lowell Art Association. It was in this house that James McNeil Whistler, the artist, was born, and the clubhouse will eventually contain an art collection. The building is about two minutes' walk from City Hall and the Memorial Library, both handsome granite structures well worthy a passing inspection, and an equal distance from upper Market street, now the center of a flourishing Greek colony of 8000 people. Just back of Market street is the new Greek church.

The monument and statue that stand in City Hall Park mark the resting place of two members of the Sixth Massachusetts Infantry who lost their lives in the Baltimore riot, on the 19th of April, 1861. They and two comrades were the first volunteer soldiers to give their lives in the Civil War. In Lincoln square, reached by way of Chelmsford street, stands a monument dedicated this year to the memory of Abraham Lincoln, the gift of the school children of Lowell. It is a granite shaft with a bronze bas-relief by Bela L. Pratt, the Boston sculptor. The homestead of the late Major-General Benjamin F. Butler is a fine old building, partly Colonial, set in an attractive estate bordering on Andover street. The State Normal School, reached by taking a Broadway car, is an excellent example of modern educational buildings, and is surrounded by beautiful grounds. Pawtucket Falls, just below the entrance to the Boulevard, dams the Merrimac River in order to divert its waters into the canals that supply water power to the larger factories and machine shops. These canals are often visited by engineering students, so notable was their construction.

There are several Lowell clubs, three of them housed in substantial quarters. The Yorick Club occupies a large three-story brick clubhouse at Dutton and Moody streets. The Highland Club has a sightly building in the Highlands. The Vesper Country Club occupies the hundred acres of Tyng's Island, and has a handsome new clubhouse in addition to its rambling and picturesque old buildings that served the members for years.

Many inviting trolley trips are offered to the old Middlesex towns that lie in the circle just beyond the city, and there are two lake resorts that attract thousands of people weekly in the summer: Lakeview, a half hour's ride from the city, and Canobie Lake Park, an hour's ride away in southern New Hampshire.

How The Small Cars Contested For Honors

LOWELL, MASS., Sept. 6—The automobile carnival opened to-day with the light car sweepstakes for Classes 2, 3, and 4, and Burman, Knipper, and Chevrolet, two on Buicks and one on a Chalmers-Detroit, each added another trophy to his collection. Magnificent weather was granted for the event, and the crowd began early to assume record-breaking proportions. So large and so enthusiastic was the assemblage, indeed, that the start of the race had to be delayed half an hour before a clear course could be secured.

Lorimer's Chalmers-Detroit came first to the line at 10:30, and dashed away at Starter Wagner's command. Shaw's Knox, Stoecker's Benz, Strang's Buick, Dingley's Chalmers-Detroit, Burman's Buick, Belcher's Knox, and Sharp's Sharp-Arrow followed at 30-second intervals. Coffey and his Columbia led Class 3, and Chevrolet's Buick, Knox's Atlas, Harroun's Buick, Davis' Moon, and Pepperday's Mercedes took up the pursuit at their given intervals. Of the smallest cars, Class 4, Grenon's Buick was first away, followed by Sickinger's Maxwell, Knipper's Chalmers-Detroit, DeWitt's Buick, See's and Costello's Maxwells, Matson's and Gelnaw's Chalmers-Detroits, and Disbrow's Buick.

In a few minutes the crowd in the grandstand rose to its feet to see the leading cars dash down the backstretch. Then the familiar cry of "Car coming!" arose. It was Lorimer, driving his Chalmers for all it was worth, as the time of 10:58 for the circuit attested. The Benz, Dingley's Chalmers, and then the Buicks of Burman and Strang dashed past in close order. Chevrolet and Coffey, of Class 3, had both passed the Sharp-Arrow, and gave promise of setting a speedy pace for the small cars. Shaw's Knox and Harroun's Buick both stopped at the grandstand supply pits, giving the crowd its first chance to see the well-drilled mechanics at work under pressure. Knipper's Chalmers led Class 4, with Grenon's Buick second. The Moon, too, stopped at its supply pit.

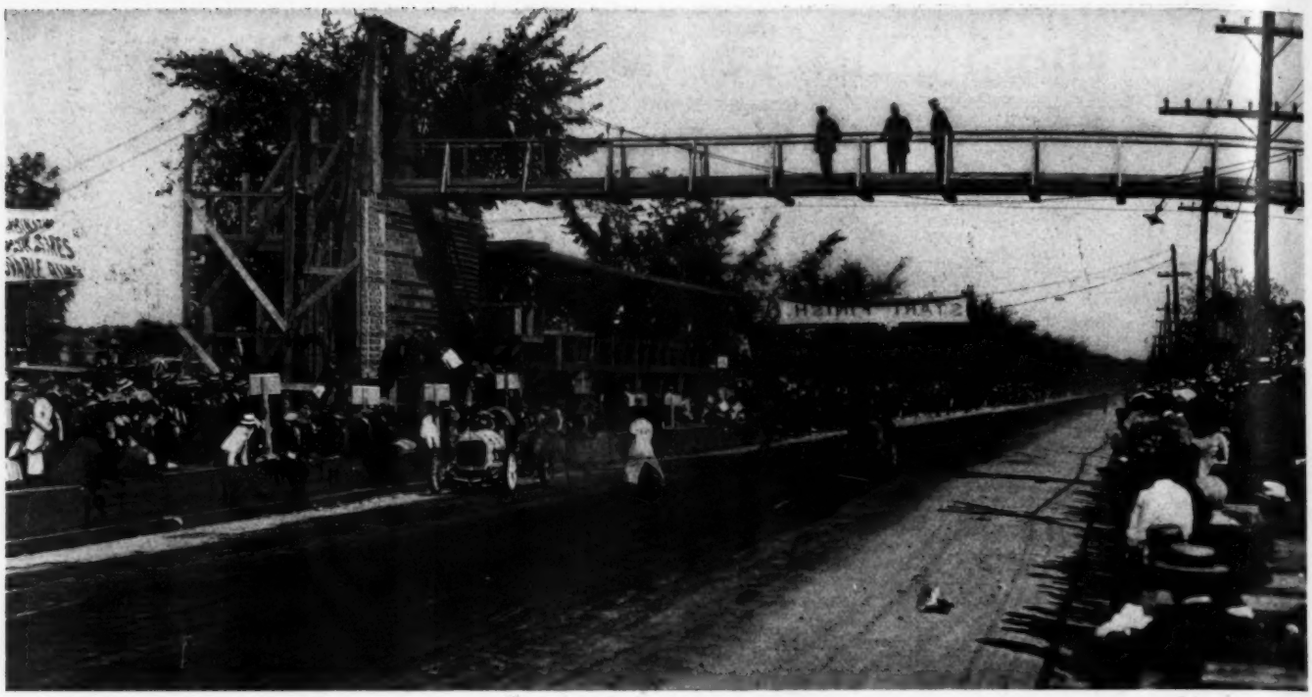
Lorimer held his lead well in the second round, completing the two circuits in 21:34. Dingley's Chalmers held fast to second place, and Strang's Buick came third. In Class 3 Chevrolet's Buick had jumped into third place in the dash past the grandstand, making it easily first in its class.

The third lap gave Lorimer an even greater lead, as he still continued his marvellous speed. Dingley followed his teammate, though at some distance; Stoecker's Benz was third, and Burman's Buick fourth. At the same time Chevrolet had rolled up a big lead in Class 3, his three rounds being completed in 33:18, only a minute and a second slower than Lorimer's. The Columbia struck a telegraph pole on the backstretch, but Coffey and his mechanician walked away unhurt. Lorimer made his fourth lap in 10:49, the fastest on record, and his time for the total distance was 43:08. Strang's Buick had jumped into second place, its time being 46:28. Stoecker's Benz and the Sharp-Arrow also had passed Dingley. In Class 3 Chevrolet was leading, followed by Harroun. Knipper and Matson had it all their own way in Class 4.

The same relative positions continued throughout the fifth lap, except that in Class 4 Costello's Maxwell replaced Matson's Chalmers as runner-up. Knipper stopped in front of the grandstand for water, providing a bit of unconscious comedy. Chalmers No. 47 took on a new tire. Word was received that the "C" Knox had run off the course at the lower turn and was badly damaged. Several persons were slightly injured. The "K" Knox had trouble and stopped for some time at the pit.

Lorimer's Chalmers finished its seventh lap, 74.2 miles, in 75:07 elapsed time, thus still further increasing its lead. Strang's Buick remained second. In Class 3 Chevrolet led Harroun by 11 minutes, and Knipper's Chalmers had a good four minutes over Costello's Maxwell in Class 4.

Chalmers Led at Half the Distance—When he completed his tenth round, half the race, Lorimer had nearly a lap on his

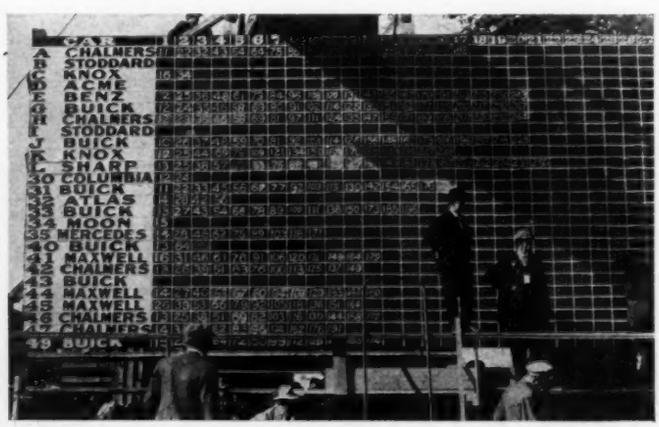


Burman Winning the Vesper Club Trophy in Class 2—Stoecker's Benz Which Finished Second Shown in Foreground Close to Fence

nearest competitor, the Strang Buick. Chevrolet lapped Harroun in Class 3. Lorimer gained still more in the eleventh, having nearly eight minutes on Strang and a little more on Burman. The Chalmers was running fine and averaging 60 miles an hour. Knipper's Chalmers made ten laps in 2:04:49, and with only two laps to go, seemed to have its class trophy won. At the end of the eleventh in Class 3, the Chevrolet and Harroun Buicks had things pretty much their own way. Davis drove his Moon off one of the turns of the backstretch, wrecking it, and the only remaining competitor was the Mercedes.

When Knipper next passed the grand stand he got the green flag for the last lap, having made eleven laps in 2:16:48. He finished in 2:28:43 for the 127.2 miles. Costello's Maxwell had a hard tussle with Disbrow's Buick, but the latter lost a wheel nearing the end of the last lap, letting Matson, too, slip ahead of him into third place. Costello's time was 2:44:01, Matson's 2:52:16, and Disbrow's 2:53:37. A protest was lodged to the effect that Knipper's car did not carry its hood for the entire distance, but Referee Hower subsequently ruled that this fault did not merit disqualification. Knipper drove a consistent race and well deserved his victory.

Chevrolet meanwhile was steadily reeling off laps in eleven and twelve minutes, and began his last round three laps to the good of Harroun. As nothing happened to disturb him, he took the race for the Yorick Club trophy, in the time of 2:56:17 for the 159 miles.



The Big Score Board That Told the Story of the Laps

Burman Supplants Lorimer in Big Race—Lorimer's Chalmers kept on clipping off laps close to ten minutes until the eighteenth round. He was more than a lap ahead of Burman when at the end of the stretch, he lost control of his car, which skidded across a front lawn into a piazza on which were seated a dozen persons. No one was hurt, but the car was put out of the contest. Burman and Stoecker had a hot duel, which the former eventually won, crossing the line in 3:49:08. Stoecker stopped to change a tire, and that proved his undoing. His time was 4:02:55. Dingley and his Chalmers nosed out Strang for third place, after more fast work. It was an exciting finish, which kept the crowd constantly on its feet until the last car had crossed the line.

A GREAT DAY FOR THE LITTLE FELLOWS

LOWELL, MASS., Sept. 6—Three races were fought out on the opening day in what seemed to the thousands of onlookers to be one contest. The victor in the field of eight, which made up class 2 for the biggest cars in the filed of 23 starters, was a Buick expertly handled by Robert Burman, who covered the 212 miles in 3 hrs. 49 min. 8 sec., averaging close to 56 miles an hour. Second ran a Benz driven by Stoecker from Germany, over a lap behind the winner, with a Chalmers-Detroit in charge of Dingley a close third. Not far in the rear came Strang and another Buick. In the Vesper Club trophy event, the cars had total piston area that ranged from 301 to 450 cubic inches.

Lorimer at one time apparently had the race won with a Chalmers which subsequently left the road on the 18th lap. By consistent and daring driving Lorimer had gained over a lap by the tenth circuit, his average being close to 60 miles an hour. His only stop was in the 17th round, when he took on gasoline and water, but neglected to obtain oil. This failure really brought with it the fatal consequences which killed the Chalmers' chances of winning. On the back stretch, when running at top speed, a piston seized owing to insufficient lubrication and not only broke the crankcase, but pushed the rear cylinders off. The cylinders fell into the steering gear in such a manner as to render the car uncontrollable and the car dashed into a nearby porch.

There came an epidemic of Buicks in the 231-300 class, Chevrolet running away with the Yorick Club trophy and having team-mate Harroun as the closest pursuer. A small Mercedes at the helm of which sat one Pepperday completed ten rounds, with the down-and-outers consisting of Moon, Columbia, and Atlas.

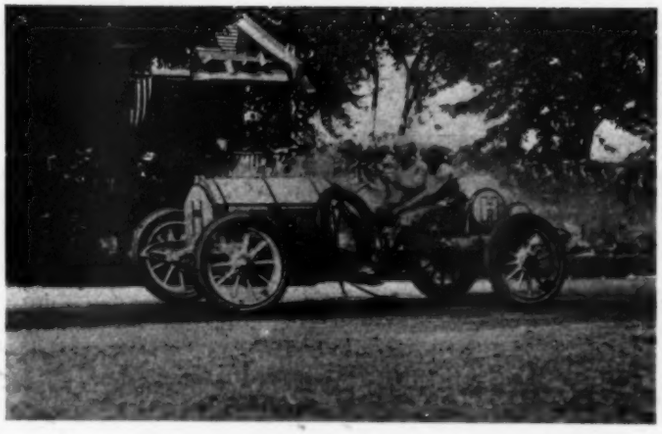
In the struggle of the littlest chaps—161-230 cubic inches—the Chalmers piloted by Knipper gained the Merrimac Valley trophy, though its loss of the bonnet for two laps caused a protest which gave Chairman Hower and his board associates a knotty point to decide. After a two-hour consideration this decision was announced:

The protest against the Chalmers-Detroit car, No. 42, for not carrying a hood at all times during the contest has been duly considered by the contest board and its decision is as follows: It seems that the hood fell from the car on the second lap on one of the curves of the back stretch, and that the car did not stop, but proceeded on its way. On the next lap the driver and mechanician made efforts to locate it, but failed. On the following lap it was discovered in a field, picked up by the driver and mechanician, and replaced on the car. The committee in investigating the case found that at the place where the hood was dropped it would have been dangerous for the car to have stopped within any reasonable distance. The committee also found that the hood was dragged away by boys. It was discovered by a nearby camper, who carried it to an open field near the road and placed it in plain sight. Taking all matters into consideration, the committee believes that the driver used all diligence in trying to locate the hood, and therefore the protest is not sustained.

Arthur See and a Maxwell made up the combination which figured as the runner-up, with another of the sturdy youngsters next, in charge of Costello. Joe Matson's Chalmers occupied fourth, with Sickinger's Maxwell and Grenon's Buick also among the finishers of the 127 miles.

While the enormous grand stand had some vacancies, due perhaps to New England thriftiness and endurance—one could get alongside the course for 25 cents and then stand or bring along your own camp-chair—there must have been close to a hundred thousand spectators scattered around the ten-mile circuit. While some minor catastrophies punctuated the racing nothing of a real serious nature happened. Shaw's Knox skidded at a turn, capsized a lunch stand, and turned turtle. In the mix-up several persons were more or less bruised. In the plunge from the road by Lorimer's Chalmers, one woman was knocked from a chair and, of course, badly scared. In other mishaps the results were small. The Columbia's swipe at a telephone pole put it out of commission, and DeWitt's Buick became a non-contestant at the same turn where the Knox came to grief.

To-day has been a day for the lower medium-priced machine in that the cars in the 161-230 piston displacement showed a better average performance than did those machines in the 231-300 class or the still bigger ones in the 301-450 category. The little fellows carried off the highest honors—nine of them started in their race and seven finished, the two to drop out being a couple of model 10 Buicks. The 301-450 class took second place in that eight of them started in their race and six finished, only a Chalmers Forty and Knox model R dropping out. The 231-300 cubic inch piston displacement class fared worst in that of the six starters only two were running at the finish, the other four, namely, Columbia, Atlas, Moon, and Mercedes having dropped out for one trouble or another.



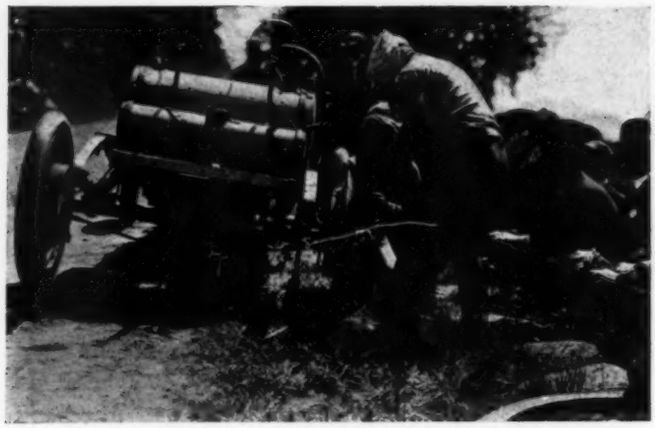
Dingley in Chalmers-Detroit Who Landed Third

It must be remembered that the distances covered by these three classes differed very widely, the small class traveling but 127 miles, the second class 159 miles, and the big class 212 miles. Of the twenty-three that started fifteen finished and eight failed. Of the eight that fell by the wayside six went out directly because of breaking car parts and two were eliminated partly through breakages and partly due to an accident such as striking a bank or skidding into a ditch.

Here in a nut shell is the elimination list: Buick broke a rear wheel; Buick injured a rear axle; Columbia broke a steering knuckle; Moon had trouble with a stopped gasoline line; Mercedes broke a pump-driving shaft; Chalmers broke a crankcase; Atlas threw and had injured beyond repair on the road, two rear-wheel detachable rings; and Knox crushed a rear wheel when it struck the bank making the turn to the homestretch.

In the multiple-entry class, the three Maxwell Q specials carried off the palm in that all three finished, this being the only make of car with more than one entry in which all finished. Of the five Chalmers that started, four finished; five of the seven Buicks that started finished; and one of the two Knoxes. There were six individual entries, that is, six different makes of which only one car of each was entered. Of these six only two finished,

Start of the Winners of First and Second in Class 4 (Merrimac Valley Trophy)—Knipper's Chalmers and Sickinger's Maxwell



Matson Makes a Quick Change of Tires at Roadside

Knipper (Chalmers-Detroit) Merrimac Trophy Winner

namely, the Sharp Arrow and the Benz; Moon, Mercedes, Columbia and Atlas not completing their respective races. The entry list showed an unusually varied assortment of names. Many manufacturers who do not ordinarily take part in racing entered representative cars. Although this added greatly to the interest of the race, this elimination looks as though the newcomers had not made proper preparation.

There Were Few Stops at the Pits

There were only fourteen stops made in front of the grandstand repair pits in the three races. Belcher in Knox K was the heaviest grandstand loser, his two stops totalling 17 minutes, all due to ignition troubles. The first stop was for 6 minutes, when the coil was tested and a couple of new spark plugs used. This did not remedy the trouble, and on the following lap a 17-minute stop was made when it was discovered that a tooth or two on the magneto gear were stripped and a new gear was used and the motor retimed. A complete set of new spark plugs were put in on the magneto side.

Not a single one of the other contestants had to make two stops at the pits. Only one of the Maxwells stopped in the entire race, and that at the end of the second last lap, when No. 45 driven by Costello had to rope up the auxiliary gasoline tank on the side of the chassis, the brackets supporting it having broken. Two minutes and 24 seconds were lost. No. 47 Chalmers lost 2 minutes in taking on a couple of spare tires and adding water. "H" Chalmers lost 3 minutes taking on water, gasoline, oil, and tightening the clutch spring. No. 42, winner in the small race, stopped for water, adjusted the carbureter, and took on a spare tire, losing 1 minute. The only stop made by the Benz was 40 seconds to take on a spare tire. No. L Sharp Arrow lost 1 minute 10 seconds taking oil and strapping on an extra tire. Burman in "J" Buick lost 37 seconds taking on oil. Strang in "G" Buick required 1.5 minute for oil and taking on a right rear tire. Chevrolet lost 1 minute by having to take on oil, a spare tire, and jack. No. 33 Buick, in the same class and driven by Harroun, had a 2-minute stop to change spark plugs. No. 32 Atlas was but 50 seconds taking oil and water. Moon No. 34 lost 4 minutes adjusting the carbureter.

MECHANICAL DATA OF CARS IN MONDAY'S RACE.

CLASS 2—DISPLACEMENT, 301-450

No.	*Car*	*Driver*	*Mechanic*	*W'ght*	*Bore*	*Stroke*	*Displacement*
A	**Chalmers-Detroit**	Lorimer	Kirker	2,295	5.0	4.75	373.2
C	**Knox "R"**	Shaw	Dennis	2,317	5.0	4.75	373.2
E	**Benz**	Stoecker	Kraemer	2,790	4.73	5.31	365.0
G	**Buick 16-B**	Strang	Larsnauer	2,430	4.5	5.0	318.0
H	**Chalmers-Detroit**	Dingley	Richards	2,315	5.0	4.75	373.2
J	**Buick 16-B**	Burman	Grennon	2,240	4.5	5.0	318.0
K	**Knox "R"**	Belcher	Jahn	2,345	5.0	4.75	373.2
L	**Sharp-Arrow**	Sharp	Sharp	2,240	5.0	5.0	392.8

CLASS 3—DISPLACEMENT, 231-300

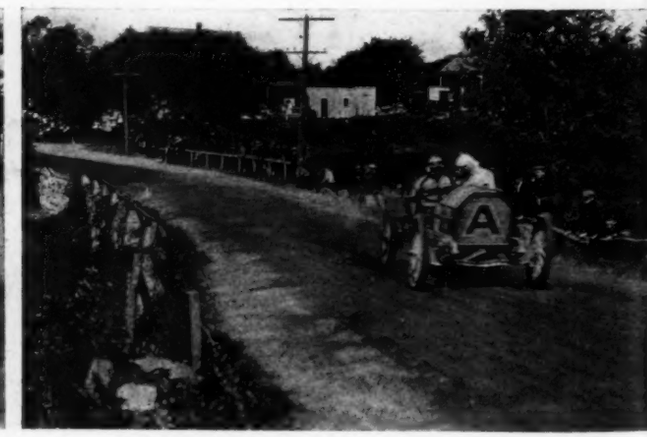
30	**Columbia**	Coffey	Kowalker	2,245	4.5	4.75	298.9
31	**Buick 16-A**	Chevrolet	Nelson	2,240	4.36	5.0	298.5
32	**Atlas**	Knox	Dufault	2,535	4.5	5.0	286.2
33	**Buick 16-A**	Harroun	Heinemann	2,155	4.36	5.0	298.5
34	**Moon**	Davis	Rockfort	2,460	4.56	4.5	294.3
35	**Mercedes 18-28**	Pepperday	McBride	1,820	3.94	5.11	248.7

CLASS 4—DISPLACEMENT, 161-230

40	**Buick 10**	Grennon	Litchfield	1,605	3.75	3.75	165.6
41	**Maxwell Special**	Sickinger	Doorley	1,505	3.87	4.0	188.6
42	**Chalmers-Detroit**	Knipper	Schnoor	1,927	4.0	4.5	226.3
43	**Buick 10**	De Witt	Swizert	1,525	3.75	3.75	165.6
44	**Maxwell Special**	See	Wright	1,520	3.87	4.0	188.6
45	**Maxwell Special**	Costello	Conover	1,500	3.87	4.0	188.6
46	**Chalmers-Detroit**	Matson	Auder	1,960	4.0	4.5	226.3
47	**Chalmers-Detroit**	Gelnaw	Riker	1,975	4.0	4.5	226.3
49	**Buick 10**	Disbrow	Gerard	1,535	3.75	3.75	165.6

The scheme of allowing a couple of pit attendants to work in replacing tires or adding gasoline, water, and oil proved a good one, and the four men working on a car at once was an inspiring sight as compared with the tired driver and mechanic seen at road races in the past.

Joe Downey (Knox) Coming Up the Rise from "The Dip"



Lorimer Just Before Accident Which Cost Him Race

CLASS 2—COMPETING FOR VESPER CLUB TROPHY.

No.	Car	Lap / Miles	1 10.6	2 21.2	3 31.8	4 42.4	5 53	6 63.6	7 74.2	8 84.8	9 95.4	10 106	11 116.6	12 127.2	13 137.8	14 148.4	15 159	16 169.6	17 180.2	18 190.8	19 201.4	20 212
J	Buick		10:28	26:07	36:56	47:55	58:48	69:55	81:06	92:09	103:16	114:45	125:27	136:24	147:40	161:58	173:27	185:33	195:45	206:51	217:51	229:08
	Bob Burman.		10:28	15:39	10:49	10:59	10:53	11:07	11:11	11:03	11:07	11:29	10:42	10:57	11:16	14:18	13:29	12:06	10:12	11:06	11:00	11:17
	Frank H. Lee.																					
E	Benz		12:30	25:29	36:26	48:17	60:32	72:34	84:22	96:15	108:06	119:54	131:43	143:30	155:18	167:14	179:05	191:03	203:00	215:08	230:00	242:55
	Ernest Stoecker.		12:30	12:59	10:57	11:51	12:15	12:02	11:48	11:53	11:51	11:48	11:49	11:27	11:48	11:56	11:51	11:58	11:57	12:08	14:52	12:56
	Fritz Kraemer.																					
H	Chalmers-Detroit		11:50	23:22	34:49	46:20	57:47	76:17	80:40	96:39	111:00	123:46	135:00	147:13	159:23	171:16	182:19	195:17	207:24	219:48	232:15	244:19
	Burt Dingley.		11:50	11:32	11:27	11:31	11:27	18:30	14:23	15:59	14:21	12:46	11:14	12:13	12:10	11:53	11:03	12:58	12:07	12:24	12:27	12:04
	Harry Richards.																					
G	Buick		12:05	23:53	35:20	46:24	57:31	68:45	79:51	91:08	102:25	113:37	125:19	139:20	150:43	162:12	177:27	188:58	200:27	216:53	232:27	246:34
	Lewis Strang.		12:05	11:48	11:27	11:04	11:07	11:14	11:06	11:17	11:17	11:12	11:42	14:01	11:23	11:29	15:15	11:31	11:29	16:26	15:34	14:07
	Louis Larseneur.																					
L	Sharp-Arrow		12:41	25:27	38:00	50:43	63:22	75:43	88:04	100:19	112:40	124:45	136:48	148:57	161:08	173:21	187:04	199:21	211:33	223:35	237:12	249:50
	W. H. Sharp.		12:41	12:46	12:43	12:43	12:39	12:21	12:21	12:15	12:21	12:05	12:03	12:09	12:11	12:13	13:43	12:17	12:12	12:02	13:37	12:38
	W. J. Sharp.																					
K	Knox		12:21	24:39	43:34	58:42	74:47	108:44	121:07	133:35	149:57	162:45	175:43	188:29	199:26	214:13	226:32	239:12	Still running.			
	Fred Belcher.		12:21	12:18	18:55	15:08	16:05	23:57	12:23	12:28	16:22	12:48	12:58	12:46	10:57	14:47	12:19	12:40				
	Wm. Jahn.																					
A	Chalmers-Detroit		10:58	21:34	32:17	43:08	53:45	64:24	75:07	85:38	96:17	107:04	117:47	128:25	139:01	149:50	160:29	171:09	182:26	Out on 18th lap.		
	Lee B. Lorimer.		10:58	10:36	10:43	10:51	10:37	10:39	10:43	10:31	10:39	10:47	10:43	10:38	10:36	10:49	10:39	10:40	11:17			
	Thos. Kirker.																					
C	Knox		15:43	34:15	Out.																	
	Fred Shaw.		15:43	18:32																		
	Albert Dennis.																					

Total distance, 212 miles.

CLASS 3—COMPETING FOR YORICK CLUB TROPHY

No.	Car	Miles / Lap	10.6 1	21.2 2	31.8 3	42.4 4	53 5	63.6 6	74.2 7	84.8 8	95.4 9	106 10	116.6 11	127.2 12	137.8 13	148.4 14	159 15
31	Buick		11:14	22:10	33:18	44:14	55:34	66:44	77:30	92:28	103:25	114:43	129:52	142:25	153:45	165:05	176: 7
	Louis Chevrolet.		11:14	10:56	11:08	10:56	11:20	11:10	10:46	14:58	10:57	11:18	15:09	12:33	11:20	11:20	11:12
	Joe Nelson.																
33	Buick		12:48	27:23	42:46	54:42	66:17	77:32	88:42	100:00	111:25	137:50	149:34	161:44	173:07	184:42	195:51
	Ray W. Harroun		12:48	14:35	15:23	11:56	11:35	11:15	11:10	11:18	11:25	26:25	11:44	12:10	11:23	11:35	11:09
	J. A. Heineman.																
35	Mercedes		13:50	27:34	47:37	61:33	75:26	89:21	103:12	117:37	132:07	170:53	Out—broken oiler shaft.				
	Tom Pepperday.		13:50	13:44	20:03	13:56	13:53	13:55	13:51	14:25	14:30	38:46					
32	Atlas		13:56	27:36	41:31	55:52	Out.										
	Elmer G. Knox.		13:56	13:40	13:55	14:21											
	Louis Dufault.																
30	Columbia		12:12	23:47	Out.												
	John J. Coffey.		12:12	11:35													
	John Kowalker.																
34	Moon		15:03	Out.													
	F. J. Davis.		15:03														
	T. Rockfort.																

Total distance, 159 miles.

CLASS 4—COMPETING FOR MERRIMAC VALLEY TROPHY

No.	Car	Miles / Lap	10.6 1	21.2 2	31.8 3	42.4 4	53 5	63 6	74.2 7	84.8 8	95.4 9	106 10	116.6 11	127.2 12
42	Chalmers-Detroit		12:40	25:32	39:11	51:16	63:25	75:46	87:35	100:28	112:33	124:49	136:48	148:43
	Wm. Knipper.		12:40	12:52	13:39	12:05	12:09	12:21	11:59	12:53	12:05	12:13	11:59	11:05
	Karl Schnoor.													
44	Maxwell		14:25	26:44	39:53	52:40	66:39	80:05	94:23	106:41	120:05	133:29	150:46	160:11
	Arthur See.		14:25	12:19	13:08	12:47	11:59	13:26	14:18	12:18	13:24	13:24	13:17	13:25
	Elery Wrights.													
45	Maxwell		13:10	26:03	39:15	52:39	65:37	78:40	91:54	105:02	118:03	136:18	150:50	164:11
	Thos. Costello.		13:10	12:53	13:12	13:24	12:58	30:03	13:14	13:08	13:01	18:15	14:32	13:10
	Geo. Conover.													
46	Chalmers-Detroit		12:46	25:22	38:24	51:18	68:56	81:56	102:40	116:15	130:05	143:33	157:53	172:16
	Joe M. Matson.		12:46	12:36	13:02	12:54	17:38	13:00	20:44	13:35	17:25	13:28	14:20	14:23
	J. R. Aude.													
49	Buick		15:00	28:39	44:15	58:06	71:49	85:18	98:49	112:18	125:45	139:13	152:52	172:37
	L. A. Disbrow.		15:00	13:39	15:36	13:48	13:43	13:29	13:31	13:29	13:27	13:28	13:39	19:05
	Geo. Girard.													
41	Maxwell		16:30	30:49	46:09	61:19	76:10	91:03	105:44	120:15	134:42	149:20	163:54	178:34
	Wm. Sickinger.		16:30	14:19	15:20	15:08	14:53	14:53	14:41	14:31	14:27	14:38	14:34	14:50
	Martin Doorley.													
47	Chalmers-Detroit		13:59	30:41	44:15	62:21	82:37	96:15	112:34	131:44	148:42	161:42	175:36	191:17
	Frank Gelnau.		13:59	16:42	13:34	18:06	20:16	13:38	16:19	19:10	16:58	13:00	13:00	16:71
	James Riker.													
40	Buick		13:13	Out—broken wheel.										
	J. J. Grennon.		13:13											
	F. Litchfield.													
43	Buick		Did not finish first lap.											
	Geo. DeWitt.													
	L. Swizert.													

Total distance, 127.2 miles.

POSITION BY LAPS IN CLASS 2.

No.	Car	Driver	Laps	1	2	3	4	5	6	7	8	9	10	11	12	13	14	5	16	17	18	19	20
A	Chalmers	Loumer		2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	Out		
C	Knox	Shaw		8	8	Out.																	
E	Benz	Stoecker		6	6	4	5	5	4	5	4	4	4	4	4	4	4	4	4	4	2	2	2
G	Buick	Strang		4	3	3	3	2	2	2	2	2	2	2	3	3	3	3	3	3	3	4	4
H	Chalmers	Dingley		3	2	2	2	3	6	3	5	5	5	5	5	5	5	5	5	5	4	3	3
J	Buick	Burman		1	7	5	4	4	3	4	3	3	3	3	2	2	2	2	2	2	1	1	1
K	Knox	Belcher		5	4	7	7	7	7	7	7	7	7	7	7	7	7	7	7	Still running.			
L	Sharp-Arrow	Sharp		7	5	6	6	6	5	6	6	6	6	6		6	6	6	6	6	5	5	5

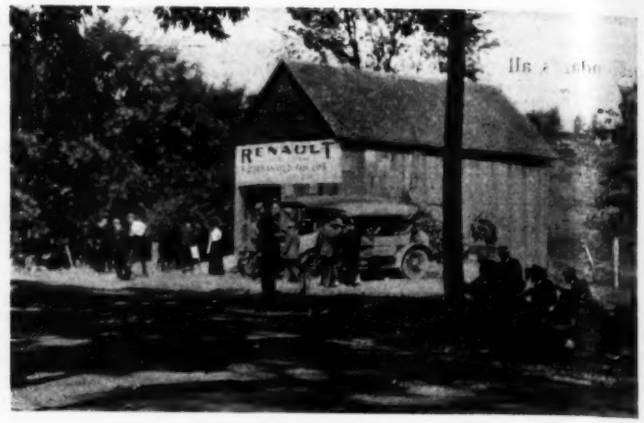
POSITION BY LAPS IN CLASS 3.

No.	Car	Driver	Laps	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
30	Columbia	Coffey		2	2	Out.												
31	Buick	Chevrolet		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
32	Atlas	Knox		5	5	2	3	Out.										
33	Buick	Harroun		3	3	3	2	2	2	2	2	2	2	2	2	2	2	2
34	Moon	Davis		6	Out.													
35	Mercedes	Pepperday		4	4	4	4	3	3	3	3	3	3	Out.				

POSITION BY LAPS IN CLASS 4.

No.	Car	Driver	Laps	1	2	3	4	5	6	7	8	9	10	11	12
40	Buick	Grennon		4	Out.										
41	Maxwell	Sickinger		8	7	7	6	6	6	6	6	6	6	6	6
42	Chalmers-Detroit	Knipper		1	2	2	1	1	1	1	1	1	1	1	1
43	Buick	DeWitt		Did not complete lap.											
44	Maxwell	See		6	4	4	4	3	3	3	3	3	2	2	2
45	Maxwell	Costello		3	3	3	3	2	2	2	2	2	3	3	3
46	Chalmers-Detroit	Watson		2	1	1	2	4	4	5	5	5	5	5	4
47	Chalmers-Detroit	Gelman		5	6	5	7	7	7	7	7	7	7	7	7
49	Buick	Disbrow		7	5	6	5	5	5	4	4	4	4	4	5

Picturesque Camp of Chalmers-Detroit Forces



Where the Renault Team and Cars Were Housed

OLDFIELD EXCELLED IN MILE STRAIGHTAWAYS

LOWELL, Sept. 7—Mile-a-minute speeds were much in evidence to-day in the mile trials held this afternoon over the Pawtucket Boulevard. The start was near Dunbar avenue and the finish at the grandstand. The course record of 45 seconds, for a flying start, was broken by Barney Oldfield, driving the Benz Grand Prize car, as well as by "Herb" Lytle with the Apperson Jack Rabbit which will be No. 16 in to-morrow's long race for the Lowell trophy. Christie was an onlooker, his speed craft being hors du combat at the moment.

The big Benz made two trials. In the first, the time was 41 seconds flat, but in a second attempt this was bettered by traveling the distance in 39 9-10 seconds, an average speed of ninety miles an hour.

The straightaway course has a bend in it about half-a-mile from the start, which considerably reduced the speed of the high-powered machines. The surface, which was very oily, contributed somewhat more to the slower times made than anticipated. As it was impossible to make a flying start at high speed because of the tortuous approach to the starting line, few of the big cars could get up to their top-notch speed before reaching the start. At the finish, the cars had to be slowed down before the finish, otherwise the turn at the end of the boulevard could not be negotiated.

Considerable interest was removed from the day's program by the absence of Walter Christie and Lewis Strang. Christie's front-driven car was disabled early in the day by a broken shaft, while Strang's Earthquake did not run out of the shop.

Events 1 and 4 were scratched, as there were no entrants. Events 2 and 3 were walkovers for the Jackson and the Matheson respectively. The summary:

EVENT 2—$1,251 TO $2,000

Pos.	Car No.	Car	H.P.	Driver	Time
1	No. 3	Jackson	40	E. P. Blake.....	1:03 8-10

EVENT 3—$2,001 TO $3,000

1	No. 9	Matheson	50	J. R. Willadsen.....	1:02 2-10

EVENT 5—OVER $4,000—(ROLLING START)

1	No. 16	Apperson ...	50	H. H. Lytle.....	0:52 8-10
2	" 7	Knox	60	Fred. Belcher	0:55 3-10

(STANDING START)

1	" 16	Apperson ...	50	H. H. Lytle.....	1:02 7-10
2	" 7	Knox	60	Fred. Belcher	

EVENT 6—FREE-FOR-ALL—(STANDING START)

1	No. 8	Benz	120	Barney Oldfield	0:51 2-10
2	" 17	Buick	30	Louis Chevrolet	0:58 9-10
3	" 20	Columbia	34	J. J. Coffey.....	0:59 9-10
4	" 4	Matheson ...	50	Neil Wahlen	1:03 8-10

EVENT 7—451 TO 600 CUBIC INCHES—(STANDING START)

1	No. 17	Buick	30	Louis Chevrolet	1:01 6-10
2	" 5	Knox	60	Fred. Belcher	1:02 9-10
3	" 14	Knox	60	Joe Downey	

EVENT 8—301 TO 450 CUBIC INCHES—(STANDING START)

			Cub. in.		
1	No. 17	Buick	318.0	Louis Chevrolet	0:59 5-10
2	" 14	Knox	522.7	Joe Downey	1:01 1-10
3	" 5	Knox	373.2	Fred. Belcher	1:02 1-10

EVENT 9—231 TO 300 CUBIC INCHES—(STANDING START)

1	No. 31	Buick	298.5	Louis Chevrolet	1:03
2	" 33	Buick	298.5	Ray W. Harroun....	1:07
3	" 30	Columbia ...	298.9	J. J. Coffey.....	1:12 8-10

EVENT 10—161 TO 230 CUBIC INCHES—(STANDING START)

1	No. 40	Buick	165.6	Bob Burman	1:07 7-10
2	" 43	Buick	165.6	Geo. DeWitt	1:08 1-10

EVENT 11—MISCELLANEOUS TRIALS—(FLYING START)

			H.P.		
1	No. 8	Benz	120	Barney Oldfield	0:39 9-10
2	" 8	Benz	120	Barney Oldfield	0:41
3	" 16	Apperson ...	50	H. H. Lytle.....	0:44 4-10
4	" 17	Buick	30	Louis Chevrolet	0:49 9-10
5	" 33	Buick	30	Ray W. Harroun....	0:52 2-10
6	Touring Car	Knox	60	Louis A. Disbrow...	0:57 7-10
7	No. 2	Berkshire ...	40	S. H. Clapp.....	1:02 9-10

POINTS OF INTEREST ALONG THE COURSE

By LEWIS E. MacBRAYNE, Chairman Publicity Committee.

ALONG the Merrimac Valley course, over which the racing cars speed to-day in contests of national interest, the Indian once pitched his tent to fish for salmon, and the pioneer planted his corn on the plantations that had just been cleared. But this was long ago. The course offers points of interest to those who are historically inclined. The old road that leads across the boulevard to the pontoon bridge once connected with a ferry that plied across the Merrimac before any bridge was built, and between the boulevard and the backstretch there still stands the old Durkee house, which was a tavern in Revolutionary times. Many a stage coach from New Hampshire bound for Boston, in the good old days, has pulled up at this quaint hostelry, which was famous for its dinners in those days.

Continuing up the river, the boulevard runs parallel with Tyng's Island, now the property of the Vesper Country Club. Here the old chief of the tribe of Indians that had lived in the valley, Wannalancit, spent his remaining days after his people became scattered in 1665; and across the river just above the island may be seen the old Drake mansion, stoutly defended by Colonel Jonathan Tyng during King Philip's War, when every

other settler had been driven back to the vicinity of Boston. The colonel was a son of Major General Edward Tyng, whose descendants all became noted Indian fighters.

Passing by the "Hairpin turn," and on over the hill at the beginning of the backstretch of the course, you will come to an old red house that stands corner to the road, across from the brook. It was built by Solomon Gilson in 1783 and is still owned by one of his descendants. Two houses below on the east side of the road stands the William Sherburne house, built by one Blood in 1780. It is recorded that "he was a victim of the 'Merino fever' and had it bad. He was said to be the only man who made any money at the time, but it developed later that he did not get his profit from his sheep, for after he moved away an outfit for making counterfeit silver dollars was discovered."

Going on again, a small frame house will be noted between the road and the boulevard. It was built more than 150 years ago, and its near neighbor, the old D. P. Coburn house, has stood for more than a century. The little red house opposite the Tyng's Island road, now owned by D. L. Page, of Lowell, was built on the race course at Mud Pond, and was moved bodily over to its present location by Nathaniel Coburn in 1775.

The Haskell Butterfield house, now used for a Summer School of Languages, was built about 1750, while the Butterfield house just beyond dates from 1790. Between the years 1725 and 1775 this quiet country road was the most populous part of Tyngsboro, and many a scene of social festivity occurred in these and many other old mansions long since destroyed.

On the part of the course on the backstretch within Lowell is a portion of fine old county road still lined by many of the trees planted in the days of the Revolution, while upon either side will be found the homesteads reared in the days when farms were several miles in extent, and the northern boundaries were described in the deeds as "the wilderness."

THE COURSE AS SEEN FROM A RACING CAR

LOWELL, MASS., Sept. 5—Accepting the invitation of the Chalmers-Detroit race manager, Harry Bill, a representative of THE AUTOMOBILE was taken over the course in Lorimer's "Blue Bird." This began at about six o'clock Friday morning, when at the judges' stand the writer took the mechanician's seat and prepared for what he expected would be a lively ride. For protection against the biting wind and stones, the scribe was togged with racing hood and rubber coat.

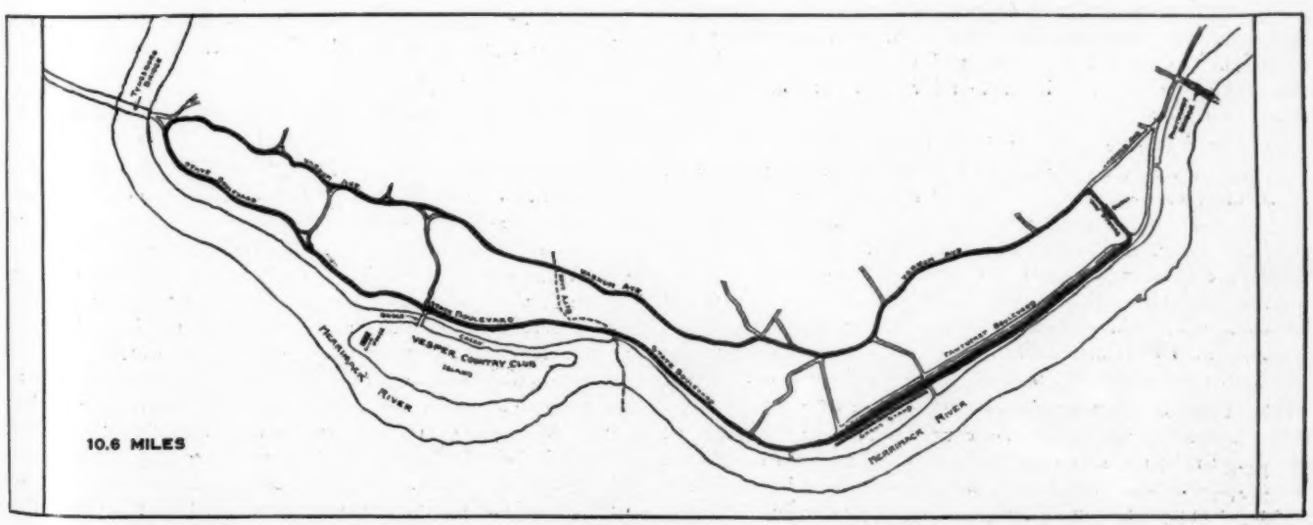
From the grandstand to the hairpin turn the road is macadam and thoroughly oiled. To dry up the oil, fine gravel was put on the road, which made it very uncomfortable for the contestants at high speeds, as the small stones were hurtled with the force of bullets almost directly into the faces of the crews. Unless radiators are protected by screens, there is danger of injury by flying stones actuated by passing cars.

From the start to the hairpin turn, about four and a half miles, there are fourteen turns, including one of the "S" variety. With the light Chalmers and skillful driving, Lorimer was able to negotiate these at nearly full speed. Although we skidded considerably, it was not so much but that a good driver could take care of his car perfectly.

Up to the hairpin turn, the road is perfectly level, and we easily held a seventy-mile-an-hour gait despite the curves. Not so on the backstretch, which contains thirty-five sharp turns and also includes five difficult "S" combinations. The so-called "Dip of Death" is also on this stretch. So difficult, in fact, is the back part of the course that it takes a speedy car and skillful driver to average much better than fifty miles per hour.

Just after leaving the hairpin turn, and before one can gain headway again, a long, sharp hill is encountered which necessitates a lower gear on many of the cars. The "Blue Bird," however, mounted this hill at a forty-mile pace on high gear. From the top of the hill until Dunbar avenue at the eastern extremity of the course is reached, the road is very tortuous and hilly. The "Dip" occurs about half the distance from the hairpin to Dunbar avenue turn and is a precipitous drop of thirty-seven feet in about a hundred yards. The sensation when going down this on a racing car is that of a descent in an express elevator in a skyscraper, or perhaps an emphasized roller-coaster. Altogether, the descent would not have any terrors if it were not for a turn at the fort and a quick ascent, beyond, which requires that the turn be taken wide open.

When we went over the course in our early morning practice, the car often skidded diagonally across the road, so viciously did Lorimer attack the turns. The last mile and a half of the backstretch are macadam, but the electric car track runs up the center of the road, calling for care when cutting across the road to take the turns. The turn from Varnum avenue, which forms the backstretch, into Dunbar, which connects Varnum with the Boulevard, is rectangular. The other end of Dunbar avenue at the Boulevard also offers a right-angle turn. These two turns were taken very fast, as the Chalmers can be skidded into the other



Map of Course Shows Location of Curves on Backstretch and Fine Straightaway Leading Past Grandstand

road by appropriate braking. Lorimer drove the car at high speed until very close to the turn, then applied the brakes quickly, and the car seemed to take its direction as we slowed down. When in the turn we were facing down Dunbar avenue an application of power stopped the skid. This action was repeated at the other turn. From Dunbar avenue down to the grandstand, the Boulevard is wide and permits of as high speed as can be made. We did about seventy-five miles an hour, and for the first time on the run one realized the speed at which these cars can travel. One had to gasp for breath and the car seemed to be striving to push the back of the seat against you.

For the lap our time was clocked by one of the newspapermen as twelve minutes. This was equivalent to about eleven and a half, where a flying start and finish can be made.

SOME GOSSIP OF THE MEET AND THOSE INVOLVED

Michelinites Had an Attractive Garb—In contrast to the nondescript dressing in most of the pits, was the serviceable half-uniform worn by the providers of Michelin tires. Khaki suits and blue shirts, with a dash of yellow in cap bands, made a neat combination.

Prunty's Far-Reaching Voice—Adding much to the enjoyment of the grand stand occupants, as well as a source of appreciation by the press, were the clearly-enunciated announcements of the silver-tongued Peter Prunty, imported from the metropolis for the occasion.

Technicists of National Repute—In David Beecroft and F. E. Edwards, of the Chicago Motor Club, and A. L. McMustry, of the Automobile Club of America, there existed a competent trio of technicists who, in the car examinations, conscientiously applied the stock car rules as they now exist. It is a good guess that the 1910 definitions will show some changes.

Heinze Was the Man in Demand—If anything went askew or anything required attention, the man searched for was the indefatigable Heinze, the carnival president, who was here, there and everywhere at all times. To John O. Heinze credit belongs for the creation of a great race meet, and the city of Lowell is now known far and wide for its progressive automobile spirit and ability to provide for one of the most successful series of competitions ever held here or abroad.

Hower as a Referee—The meet signalized the initial appearance of Chairman Hower in the referee's role, the reason for his taking the position being the national character of the racing. 'Tis understood that Chairman Hower has had his fill of honors in the competitive field of automobiling, and some time ago he gave utterance to the statement that he would not seek or accept a continuation in office. Even those who have disagreed with Hower credit him with energy and persistence.

Press Arrangements Excellent—Under the direction of Lewis E. MacBrayne, chairman of the publicity committee, the arrangements for the men who told the story of what happened could hardly have been improved upon. There was plenty of room in the capacious press stand, an abundance of wires and operators, with refreshments available when the workers felt the need. To make comfortable and facilitate the activities of those who write the tale is wisdom for the management of any affair, be it great or small.

President Speare Unobtrusively Prominent—One who had no small part in the proceedings was Lewis R. Speare, the A. A. A. chief executive. New England supplies much strength to the national body, and its scenic grandeur and miles of excellent roadway attract thousands of auto tourists. There is as much pride of country as in the more vociferous West, but it is expressed in a lower though no less determined key. President Speare is a Bostonian with a family-tree that finds its roots in the landing of the Pilgrims, and his accession to the leadership of the A. A. A. naturally found much New England approval.

The Door of Opportunity—In the races of 1908 there assisted in the guarding of the course, Patrolman George H. Brown. In the races of 1909 Mayor George H. Brown and Mrs. Brown, his former stenographic secretary, surveyed proceedings from the municipal box in the grand stand. Of course, it must be said that the present mayor made an exceptional patrolman, and the opportunities of politics did the rest, in opening the abrupt door to the mayoralty of a manufacturing city. His candidacy was not taken seriously until too late, and then the votes were in process of being counted.

"Lowell's Vertebrae"—A mile of brick cotton factories that line one bank of the Merrimack river, is what Secretary John A. McKenna, of the local automobile club, called "Lowell's vertebræ" in the historical sketch of the city, which has a hundred thousand folks, and includes about 8,000 Greeks who live in a section by themselves. One can see the house in which Whistler, the artist, was born, and also the former homestead of Gen. B. F. Butler. The old Spaulding house, once used as a tavern and now occupied by the Daughters of the American Revolution, is referred to as an example of the excellent architecture of colonial days.

Some Thrifty New Englanders Who Profited—Certainly such a catchpenny opportunity never before arrived in New England. Several times bigger, actually, than any country fair or circus, because of the number on the scene, and much bigger, theoretically, because of the class of those in attendance, the field for merchandising appealed to both the peripatetic fakir and the thrifty native as the chance of a lifetime. Everything that Yankee wit, stimulated by prospect of profit, could think of, was for sale, and the prices were low. One man near the grandstand cut away prematurely a portion of his crop of corn in order to have parking space for a few cars, and no resident on the course was of too high estate to lease his ground to the sightseers. At Roberts' corner, one native had a fence of unbarked posts and wires, manifestly put up in a hurry. On the lawn within the fence were several signs: "Private Grounds—no trespassing"; "Autos and teams $1 parked here"; and these were cunningly flanked by the official sign of the Lowell Automobile Club, reading: "Danger! Keep Back of This Wire!" The owner probably expected the club sign to drive everyone inside his property line at a profit to him, but he had a merry time trying to live up to his "no trespassing" sign. He did a good business, though, and so did a neighbor who charged the sporty populace for a foothold on his stone fence, which was not at all of that New Jersey variety which dissolves the foothold.

"WALKERS" FOR CONNECTICUT HIGHWAY

HARTFORD, CONN., Sept. 7—For the inspection of the State trunk highways, there will soon be fully installed a system almost as thorough as on a railroad. State Highway Commissioner James H. MacDonald has arranged to keep the newly constructed macadam sections under constant surveillance, having men whose duty is to watch the roads and when any little breaks appear fix them, and then report accordingly. The asphaltic oil, which was purchased recently, is now being distributed, work starting at Meriden, and the treatment will be closely watched. A great many automobiles travel over the routes through that city and the oil is to allay the dust rather than as a constructive binder.

Old Boston Post road from Greenwich to the Rhode Island border is being improved, including two of the worst sections of road in this State. The Saybrook Ferry road, which is generally considered bad, is also being repaired, and the East Lyme stretch over the river is likely to be bettered very shortly.

STOCK CARS FEATURE WILDWOOD'S LABOR DAY RACES

WILDWOOD-BY-THE-SEA, N. J., Sept. 6—No speed records were broken this afternoon in the maiden meet of the youthful North Wildwood Automobile Club, but with 28 separate dashes over the mile stretch on Ocean avenue there was a well satisfied crowd of spectators and club members. For two and a half hours, the broad roadway was roped off for the contests and there were sufficient machines all told on hand to furnish a good day of fast sport. The regular Labor Day crowd of many thousand people was also in evidence, but there was no trouble in keeping them back for the route of the autos, and, in fact, the entire management of this event elicited great praise. The new clubhouse has made this Jersey coast resort more of a rendezvous for the automobilists from the Quaker City and neighboring points than ever before.

Willie Haupt, in the six-cylinder Alco, and Joseph Parkin in a six-cylinder machine of his own make, were the star performers, and, with the exception of the Parkin, all the competitors were stock models. Packards, Peerless, Cadillac, Overlands, Fords, Mitchells, Acme, and Pullman took part actively, and interspersed with the races between the four-wheelers there were some exceptionally fast ones for motorcycles. The Lowell carnival evidently kept some of the regular Wildwood entries away and prevented the possible lowering of records. The day was a perfect one for speed, except for a head wind, and that difficulty was overcome by allowing the fastest of the cars to show their abilities in both directions.

It was the wind direction and the running over the course both with it and against it that gave Willie Haupt the honor of the fastest time of the afternoon. In the time trials the Parkin was sent down the mile first, and its time caught at :54 4-5 as against the :55 seconds of the Alco 70. When the officials gave the motorcyclists the privilege of running with the wind, with a difference of five seconds in their time, it was agreed to allow Haupt and Parkin to do likewise. The former was thus able to win out, for his big car reduced its time to :51 1-5 seconds, an average of 70.3 miles per hour, while the Parkin's record was :52 4-5. In the free-for-all, however, the latter finished the mile fully 40 yards ahead of the Alco, in :55 1-5. These two machines were the only under-the-minute ones present, although Parkin sent a Packard roadster down the line in a minute flat. What was lacking in sensational speed was made up in the exciting finishes, for in a number of the events the machines were remarkably well matched and crossed the line with but a few feet or inches separating.

R. A. Jackson's Mitchell 20 just managed to nose out H. F. Hunter's Overland in the $1,250 and under event, with the 22-horsepower Ford, driven by E. S. Byam, but a length in the rear. The winner's time was 1:18. The Cadillac's victory over the Mitchell in the $1,251 to $2,000 class was similarly close, the former covering the distance in 1:10. Another eyelash race was witnessed in the triangular contest between the Peerless, Acme, and Packard in a special event—put on to fill a gap for cars in the $3,001 to $4,000 class, which did not appear. The Peerless, belonging to Ben Griscom, was driven by R. H. Nimms and was but a scant wheel length ahead of the Acme, driven by J. W. Ely, while the latter was but 10 yards ahead of J. W. Beck in the Packard. Another filler was a match race between a 40-horsepower Pullman, driven by J. L. Brown, and a 30-horsepower Overland, with H. F. Hunter at the wheel. The York-built machine won by about 20 yards, its time being 1:11 4-5. A consolation event brought out all the non-winners and was annexed by Beck's Packard in 1:23, with Joe Parkin in a Mitchell and Byam in the Ford as runners-up.

GASOLINE STOCK CARS, $4,001 TO $5,000

Pos.	Car	H.P.	Driver	Time
1	Packard	30	Jos. Parkin	1:05 3-5
2	Packard	30	Geo. Meeley	

GASOLINE STOCK CARS, $1,251 TO $2,000

1	Cadillac	30	Frank Paxson	1:10
2	Mitchell	40	Cherie Borie	
3	Mitchell	30	Jos. Parkin	

GASOLINE STOCK CARS, $1,250 AND UNDER

1	Mitchell	20	R. A. Jackson	1:18
2	Overland	30	H. F. Hunter	
3	Ford	22	E. S. Byam	

SPECIAL EVENT

1	Peerless	30	R. H. Nimms	1:08
2	Acme	48	J. W. Ely	
3	Packard	30	J. W. Beck	

MATCH RACE

1	Pullman	40	J. L. Brown	1:11 4-5
2	Overland	30	H. F. Hunter	

CONSOLATION RACE

1	Packard	30	J. W. Beck	1:23
2	Mitchell	30	Jos. Parkin	
3	Ford	22	E. S. Byam	

TIME TRIALS

1	Alco	70	Willie Haupt	:55 :51 1-5
2	Parkin	50	Jos. Parkin	:54 4-5 :52 4-5
3	Packard	30	Jos. Parkin	1:00
4	Peerless	30	R. H. Nimms	1:03
5	Cadillac	30	Frank Paxson	1:05
6	Packard	30	J. L. Fritz	1:06 2-5

FREE-FOR-ALL

1	Parkin	50	Jos. Parkin	:55 1-5
2	Alco	70	Willie Haupt	
3	Cadillac	30	Frank Paxson	

MINNEAPOLIS AUTOISTS HAVE EXHIBITION

MINNEAPOLIS, MINN., Sept. 4—This city will open the automobile exhibition season next week, in connection with the State fair, for a mammoth auto show will be held in the new grandstand building. This huge concrete structure has an exhibition room 300 by 150 feet in size, one side of which is composed entirely of windows. The following makes of cars have been placed upon the list: American, Pope-Hartford, Reo, Holsman, Chalmers-Detroit, Hudson, Thomas, Velie, Elmore, Inter-State, Pullman, Winton, Peerless, White, Cadillac, Rapid, Black, Columbus, Frayer-Miller, Mora, Halliday, Mitchell, Chase, Minneapolis, Regal, Midland, Pennsylvania, Richmond, Jackson, Maxwell, Hupmobile, Brush, Schacht, Detroit, Wilcox, McIntyre.

Hundreds of people visit this fair during the week, and the automobile and accessory concerns always do an immense amount of business. On Saturday there will be races on the track.

STATE GOVERNORS INTERESTED IN ROADS

The replies from Governors and Mayors of many States and cities to invitations asking that delegates be sent to attend the second annual National Good Roads Convention bear eloquent testimony to the growth of the Good Roads movement in all parts of the country. Although the tentative program and invitations were issued by the A. A. A. committee only a week ago, favorable responses have been received from the Governors of twelve States.

Governor Patterson, of Tennessee, sent a particularly interesting letter, stating that he had called a Good Roads convention in his own State to be held at the same time as the National Convention, and would also be represented by several delegates. The other States from which representatives have been promised are New York, Maine, Wisconsin, North Carolina, Maryland, Indiana, Arkansas, Nebraska, Kentucky, Iowa and Illinois.

Aeroplanes in Actual Contest at Rheims

by W. F. Bradley

Three Aeroplanes Racing Down the Homestretch at Rheims—Latham, Lefebvre and Bunau-Varilla

BETHENY, near Rheims, Aug. 30—Old Glory floats in the front row of a line of sheds facing the aviation ground on which the world has been shown that the aerial way is established. When the American team took up its quarters in the wooden establishment reserved for it, Glenn H. Curtiss pronounced conditions ideal for the aeroplane; his friend and assistant, Ward Fisher, passed a favorable judgment on the two sleeping rooms in the rear; Tod Schriver, ex-circus performer, now skilled mechanic and indispensable helper, did not care much what the accommodations were, but he must have Old Glory floating from the roof. A Rheims department store furnished the Stars and Stripes; Schriver scrambled to the top of the building, planted the flag, and the crowd came immediately. There is not an American on the ground who has not done his best to break through the line of gendarmes carefully guarding the enclosed camp where aeroplanes and aviators are housed. Many of them have succeeded either legitimately or otherwise in procuring passes that allow them to get a closer look at the flyers. All day long it is a procession of people from the other side of the water anxious to look at the machine and wish its pilot good luck. Cortlandt Field Bishop, as stockholder in the Herring-Curtiss Company and president of the Aero Club of America, is daily on the spot. The American automobile world is well represented by Jefferson De Mont Thompson, treasurer of the Long Island Motor Parkway; Roy D. Chapin, of the Chalmers-Detroit Company; H. L. Kittredge, of the Peerless Company, who has just been touring Europe on a 1910 Peerless, and various others. Royalty is not missing, many a member of the ruling families of Europe dropping in to see Curtiss and the American machine. President Fallières on his short unofficial visit found time to greet the American aviator and wish him success in the races.

There are thirty-eight aeroplanes on the ground, and as each one has a shed as large as the average suburban dwelling house a good idea of the size of the camp can be obtained. Some of the companies, as in the case of the Curtiss team, have fitted up their quarters as if for a permanent stay, with comfortable sleeping rooms in the rear, prints and flags on the wall, and an air of orderliness and cleanliness everywhere. Others let the aeroplane have all the space, leaving the shed at night stoutly barricaded and in the care of a watchman. Others again live in a piggish style, with a camp bed on the grass-covered floor, or with merely a mattress thrown inside a packing case, while butter and sardines and canned beef are mixed up indiscriminately with mechanics' tools, oil and grease; to complete the confusion a couple of horses may be stabled in one corner.

Down the line, a few yards from the Curtiss headquarters, is the Bleriot establishment. Though the two men have not yet exchanged a word directly, for Bleriot is ignorant of English and Curtiss has not been known to utter a word of French, there is a mutual sympathy and admiration between the two. Unlike the generally accepted description of the Frenchman, Bleriot is cold, calm, unemotional, possessed at the same time with a quickness of action and a stronger determination than most men. Bleriot was out for the Gordon Bennett cup and the speed test. Curtiss crossed the Atlantic with the same object in view. Thus though they are admirers they are also rivals. Curtiss puts his faith in a biplane, practically identical with the one with which he made flights at Morris Park and on Long Island, but equipped with a new eight-cylinder motor developing 30-35 horsepower. It is a light, handsomely constructed machine, with a lot of original details about it that call forth the admiration of the experts. Bleriot's best apparatus is a No. XII monoplane—the twelfth in the long series of machines he has constructed—fitted with an 80-horsepower E. N. V. motor.

This aeroplane is larger and much more powerful than the one which crossed the English channel. The wing surfaces are flexible and are mounted at the fore end and on the upper portion of a long metal chassis. Below them is a platform carrying the motor and the wide seat for pilot and one passenger. The space is so great that a second passenger could be accommodated without much difficulty. The eight-cylinder engine is of the V type, with cylinders cast separately, machined inside and out and capped with a jacket obtained by a system of copper deposit. This avoids the use of an independent head, with joints than can rarely be kept tight when running at full power for any length of time. To enhance its chances of success the engine is fitted with double ignition by high-tension magneto and storage batteries, both sets of plugs being in the head.

The drive is taken from the forward end of the crankshaft to a propeller shaft carried in ball bearings just below the wing, by means of a chain. The propeller, a two-bladed wooden one, is geared down about one-third. On the standard machine the gasoline tank is carried within the upper and lower surfaces of the wing, the fuel, of course, flowing down to the carbureter by gravity. As this machine will also be used in the endurance test a very much larger tank has also been fitted under the pilot's seat, holding enough fuel for a four hours' trip in the air. All controls with the exceptions of the vertical rudder, operated by the feet, are combined in a single steering column mounted on a universal joint and consequently capable of being turned in any direction. Throttle and spark advance levers are fitted just

below the steering wheel. The gasoline pressure pump and supplementary oil pump are at the pilot's right hand.

Bleriot has a second and similar machine fitted with a powerful three-cylinder Anzani motor, which like the first has transmission by chain to a ball bearing shaft carrying a two-bladed wooden propeller. It was with this machine that he qualified for the Gordon Bennett cup, but was later unable to get much speed out of it. The motor persistently heated despite all the attention given to it by the mechanics. After a thorough examination by Anzani it was discovered that it was geared too low. Thus constantly racing with a higher gearing very satisfactory results were obtained. The same type of motor, but of much smaller size, was employed on the cross-Channel flight and is fittetd to three duplicate machines used here. Anzani disposes his three cylinders fan-wise, connecting all three rods to one crank and employing internal flywheels as in the standard type of single-cylinder vertical motor.

Up to the present the most successful motor here is, strangely, the newest and most freakish. It is an air-cooled Gnome with seven cylinders, which revolve together with the crankcase, the hollow crankshaft being stationary. Up to the present this motor has never "laid down" in a race. Practically every part is machined out of solid bars of nickel steel. Even the cylinders are produced in this way, being first roughly shaped out, their fins formed and profiled so as to give greater depth at the top than at the base; then the inside is hollowed out, giving a shell very much lighter than can be obtained by casting and at the same time of greater strength than any cast cylinder.

The method of attaching is original, each of the cylinders passing through a hole bored for it on the face of the circular nickel steel crankcase. They are secured by a locking ring on the inside of the case. With the cylinders and case revolving together the tendency is for the former to be pulled out of their case. A locking ring round the base within the casing is therefore all that is necessary. The exhaust valves are in the cylinder head, operated mechanically. The inlet valves are in the piston head, operated automatically. The crankshaft being fixed and hollow is employed for the admission of the explosive mixture into the crankcase and through the piston head valves into the combustion chamber. Ignition is by a standard type of high-tension magneto specially geared to provide seven sparks for each two revolutions of the engine.

There are a few machines here using practically a standard type of automobile motor somewhat lightened for aerial work. Henry Fournier was one of these, with an Itala of four cylinders developing 40 horsepower and lightened in its accessories only. Even the radiator was the absolutely standard type as used on automobiles. Vivinus furnished a practically standard type of four-cylinder automobile motor for aeroplane work, fitting it to two of the machines entered by Henry Farman.

Up to the present it has been impossible to learn any really practical lessons regarding the respective merits of the standard heavy and the special light-weight motor. In both classes there have been striking successes and partial failures. One point that has been clearly proved is that it is not really necessary to obtain a feather-weight engine in order to rise from the ground.

Castor oil is very extensively employed for lubricating the aeroplane motors. Bleriot uses it exclusively for both his small and large motors. All the Gnome engines use it for the main bearings. Employers of pure castor oil are unanimously of opinion that it is excellent as a lubricant. The only objection that can be raised against it appears to be that its smell is objectionable. Certainly the camp here at times smells as if a drug store had been set on fire.

America's share of the honors of the meet has been sufficient to show that this nation means to keep in the foremost rank of the new invasion of the air. There were some who thought that America's first and last word in aeronautics was the Wright brothers, and that the European nations, especially France, with her hosts of experimenters, would quickly regain pre-eminence. They have learned their mistake. The Wright machines played a prominent part in the meet, and Lefebvre, Tissandier and Lambert were among the most successful of the aviators, but Curtiss alone could easily have upheld the reputation of his country. In actual number of victories his machine was surpassed by Latham's Antoinettes and equalled by Farman's machine of his own construction, but the impression produced by the swift and sure "Golden Flyer" was second to none.

LEFEBVRE KILLED TESTING AEROPLANE

JUVISY-SUR-ORGE, FRANCE, Sept. 7—E. Lefebvre, who took a prominent part in Rheims week, was killed to-day by a fall while testing one of several new Wright aeroplanes which were being prepared for delivery. He was flying at a height of only 20 feet when the machine swerved sharply downward and struck the ground with great force. The cause of the accident is unknown.

WRIGHTS BUY LAND FOR AERODROME

SPRINGFIELD, O., Sept. 6—Wilbur and Orville Wright have purchased about 700 acres of land at Tippecanoe City, near here, to use for their experiments with aeroplanes. It is reported that the brothers will erect an extensive factory and begin to manufacture their aeroplanes on a commercial scale.

Roy D. Chapin and Glenn Curtiss

Aeroplane Sheds Were Watched with Great Interest from the Grandstand

RESULTS OF WINNIPEG AGRICULTURAL MOTOR TRIALS

THE Winnipeg Industrial Association conducted its second farm-motor competition with an entry list of 22 machines, of which 18 took part in the trials, and unusual interest was aroused both among the manufacturers and the farmers. The tests comprised a two-hour brake run, and demonstrations of hauling and plowing, and the machines were also carefully examined with respect to design and construction, accessibility and protection from mud and dust, ease of operation, and clearance of working parts from the ground. The type included both internal combustion and steam; the former were divided into three classes, according to horsepower.

For the brake test a special rope-brake had been constructed by the engineer in charge, and this was applied to each mottor in turn. Careful records were kept of the load applied and the speed of the motor, its consumption of water and of coal or wood, if steam, and of gasoline or kerosene, if internal combustion. These tests averaged in length two hours. The hauling demonstration was held over a soft and gravelly piece of ground half a mile long, which was traversed about ten times by each machine. The load, distance, time, fuel consumed, and drawbar pull were recorded. The plowing test was extremely interesting, although the results depended as much on the plows as on the tractors. Full results of all the tests are given in the table appended below.

Official Records of the Entries and Results in the Second International Trials for Agricultural Motors held at Winnipeg, from the 8th to 17th July.

Class A, Internal Combustion (20 h.p. and under); Class B, Internal Combustion (20 h.p.—30 h.p.); Class C, Internal Combustion (over 30 h.p.); Class D, Steam.

Class.	Entry No.	MAKERS.	Cylinders. Number.	Cylinders. Diameter.	Cylinders. Stroke.	Pulley. Diameter.	Pulley. Face.	Driven. Diameter.	Driven. Face.	Total which can be driven.	Capacity of fuel tank.	Capacity of water tank.	Weights. Total.	Weights. On driven.	Cash price f.o.b. Winnipeg.	Brake tests. H.p. developed.	Brake tests. Revolutions engine pulley.	Brake tests. Water used gallons.	Brake tests. % Water used.	Brake tests. Fuel used.	Brake tests. % Fuel used.	Brake tests. H.p. hours per unit of fuel.	Brake tests. Running time.	Class.	Entry No.	MAKERS.	Brake tests. Mean effective pressure.	Brake tests. Water evaporated per lb. of coal.	Brake tests. Lb. of water per h.p. hour.	Hauling tests. Load hauled.	Hauling tests. Average drawbar pull.	Hauling tests. Distance travelled.	Hauling tests. Fuel used.	Hauling tests. Time hauling.	Hauling tests. Lbs. fuel per unit of fuel.	Hauling tests. Drawbar h.p.	Hauling tests. Drawbar h.p. Plain h.p.	Hauling tests. Water used.	Hauling tests. Lbs. hauled per gal. water.	Ploughing tests. Ploughs. Number.	Ploughing tests. Ploughs. Width.	Ploughing tests. Acres ploughed	Ploughing tests. Time ploughing.	Ploughing tests. Average drawbar pull.	Ploughing tests. Water used	Ploughing tests. Fuel used.	Ploughing tests. Fuel per acre.
A	8	Hamilton-Corn. harvester*	1	in. 6	in. 14	in. 28	in. 6	in. 6	in. 6	ft. in. 7 6	30	30	2660	7300	1700	19·7	840	4·19	7·2	1·47	6·9	13·4	min. 60	A	5	International Harvester*	20	—	—	12270	1053	lb. 28800	944	min. 1054	1040	19·4	636	0·7	—	2	in. 12	1·00	7·4	1510	0·12	1·64	1·6
	10	Avery Co.†	4	4½	8	24	9	41	12	7 3	30	75	3300	3300	3300	17·9	805	7·5	13·5	0·3	2·5	6·9	135		15	Avery Co.†	40·9	—	—	7324	612	42600	0·43	117	6207	9·7	648	9·7	—	2	14	1·00	16	1260	16	9·87	9·8.
	12	Marshall Sons and Co.†	2	7	7	38	7	70	10	9 5	30	54	14660	—	2650	—	—	—	—	—	—	—	—		16	Marshall Sons and Co.†	—	—	—	12070	1330	12440	10·21	1114	8465	9·7	—	35	—	5	14	1·00	10	2250	—	7·35	4·6
B	6	Russell and Co.† ...	2	6	10	28	10½	28	16	6 6	45	71	17180	13850	3400	32·5	811	7·5	10·5	0·4	1·5	9·5	81	B	6	Russell and Co.†	41·2	—	—	20850	1885	12750	0·13	764	4707	10·1	615	12·5	—	4	14	1·7	12·4	2250	—	7·38	4·22.
	7	International Harvester*	2	6½	12	42	10½	70	10	8 6	30	50	13200	9600	3200	33·0	854	6·32	9	0·7	14·9	11·9	130		7	International Harvester*	78	—	—	20970	2100	12750	4·15	720	20000	12·25	630	9·8	—	5	14	2·17	17·7	3900	10·6	5·12	3·4
	13	Kinnard Haines Co....	2	6½	7	30	9	64	10	8 1	35	100	13875	—	3300	29·7	889	9·6	6·9	7·5	10·0	0·0	1195		13	Kinnard Haines Co.	82·6	—	—	19440	1995	24120	0·22	96	6395	17·5	620	13	—	5	14	2·22	22·1	3255	9·6	6·14	7·01
	17	International Harvester	2	6½	12	38	10½	70	10	6 6	35	54	12500	9600	3200	34·2	886	9·5	17·6	0·9	1·3·6	12·4	130		17	International Harvester	80·4	—	—	17000	1775	28800	0·45	1275	7650	11·2	460	12	—	4	14	1·7	12·1	2750	—	4·37	3·82
	21	International Harvester‡	1	6½	12	38	10½	64	10	6 6	35	53	12850	9450	3200	34·9	880	12·5	22·0	0·6	1·4·6	12·0	130		21	International Harvester‡	84	—	—	18000	1750	28800	0·66	1125	6937	12·0	460	12·7	—	4	14	1·7	12·1	2520	10	4·52	3·52.
C	9	International Harvester	2	6½	14	42	10½	75	12	—	54	97	20000	14000	3700	49·6	826	11	21·6	1·2·1	12·4	7·6	130	C	9	International Harvester	79·2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	9	Gas Traction Co. ...	4	6	6	24½	9	98	12	—	97	—	13500	9000	3700	—	—	—	—	—	—	—	—		9	Gas Traction Co. ...	—	—	—	21000	2700	24120	11·0	96	6000	29·0	—	4·6	—	6	14	1·97	14·9	3220	—	4·72	3·77
	8	Marshall Sons and Co.†	4	7	7	32½	10	70	14	10 5	61	70	23000	16000	5400	69·5	885	11·2	20	1·0·4	16·2	7·6	130		8	Marshall Sons and Co.†	89·6	—	—	26000	4330	21440	12·14	1034	9035	27·5	625	20	—	8	14	2·22	21	3500	—	5·21	3·77
	15	Kinnard Haines Co.*	4	7½	8	30	10	98	14	9 5	40	120	16000	—	3700	45·6	825	9·4	9·5	1·0·9	27·7	9·4	130		15	Kinnard Haines Co.*	84·6	—	—	27745	3000	24120	0·21	1125	6000	29·7	660	10	—	8	14	2·4	18	4200	—	6·42	3·42
	19	International Harvester‡	1	10	15	40	10½	72	12	—	97	71	17000	13600	3400	31·5	522	12	10·3	0·6	10·1	12·0	130		19	International Harvester‡	86	—	—	13500	2250	21440	7·14	110	9720	14·7	625	15	—	—	—	—	—	—	—	—	—
D	1	J. I. Case Co.*	1	13	13	48½	16	84	16	12 10	lb. 2000	225	42000	28000	6200	97·5	320	200	13·0·0	700	35	30	175	D	1	J. I. Case Co.*	45	9·6	12·5	27000	2000	21600	0·13	180	14000	24·7	1225	650	175	12	14	2·6	20	3200	800	4·12	3·20
	2	M. Rumely Co.	2	7½	14	40	12	84	40	12 6	1400	400	27000	—	5274	120·5	320	7·1	13·0·0	1·0·51	7·4	12·4	130		2	M. Rumely Co.	65	7·4	12·5	40000	4000	24120	0·66	220	17000	30	1225	1000	250	14	14	4·20	70	8000	—	8·20	3·25
	11	Marshall Sons and Co.	1	13	13	27	10	70	20	11 5	600	200	20000	17000	5250	—	—	—	—	—	—	—	—		11	Marshall Sons and Co.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	14	Russell and Co.†	2	13	13	42	14	84	36	11 5	275	450	28400	12000	5400	65·6	311	450	9·0·6	445	60	29·2	125		14	Russell and Co.†	—	9·0	12·5	34000	4000	21450	654	110	15000	23·6	640	275	100	10	14	2·10	70	7400	470	4·54	3·25
	20	Avery Co.‡	2	7	10	40	12	90	26	11 5	2700	280	40000	31250	7250	72·6	324	320	10·0	0·5·5	9·9	10·1	130		20	Avery Co.‡	74·5	5·4	12·5	34000	4700	12750	600	95	13700	32·1	640	250	120	10	14	2·6	70	7200	—	4·10	3·27

*1st. †2nd. ‡3rd. Fuel consumption is stated in Imperial gallons (277·27 cub. in.) or 10 lb. of coal. ‡1st. †2nd. Length of ground ploughed 1000 ft. Length of hauling course, 2640 ft.

RECENT FRENCH MOTOR PLOW TRIALS

PARIS, Sept. 1—Agriculturalists will have an opportunity of seeing how plowing can be done without the aid of horses or oxen at an exhibition to he held at Amiens on September 24. The occasion is an international competition and motor congress intended to develop the use of the internal combustion motor in agricultural pursuits. In the motor plowing match each of the competitors will be given a piece of land on which to operate, the classification being established on the manner in which the plowing is done, the cost per acre, the time necessary to bring the machine to the field and put into operation, the number of men required, the facility with which work can be done on varied land, and the possibility of using the motor for other work on the farm.

This is the second occasion on which a plowing competition has been held in France, the first being last year at Bourges. In order to encourage the use of motors on farms it has been decided that a series of exhibitions, competitions and congresses shall be held, a different center of France being selected each year. Up to the present French constructors have not paid very close attention to the development of very simple motors for use on farms, or to motor-driven or steam plows. In the last competition America and England were well represented, and will figure again in the Amiens competition. French entries will doubtless be larger than last year. Too much credit cannot be given the French nation as a whole for the tests of this nature, which they hold every year and in every branch of the industry. These tests lay the foundations of good business.

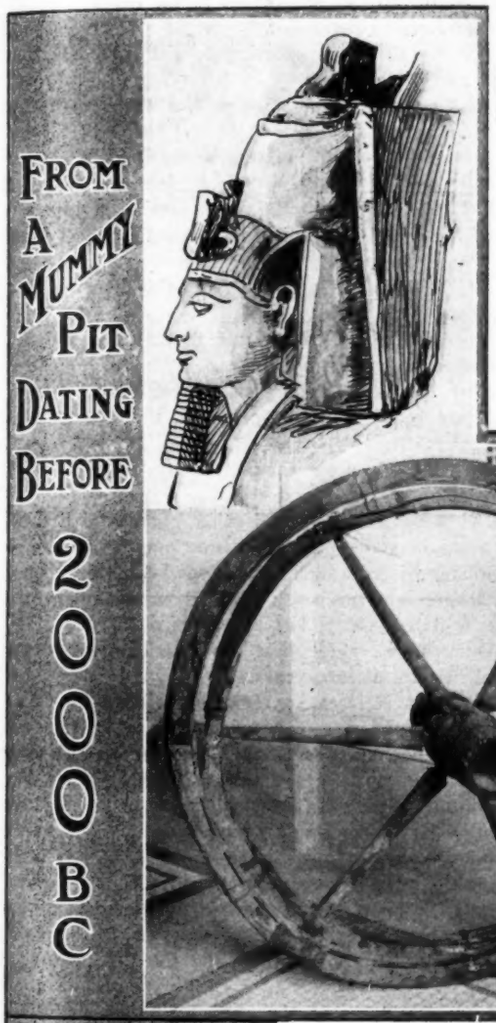
DIRECT INJECTION OF FUEL FOR MOTORS

That direct injections of fuel have the advantage of weighing out an exact amount of the same is self evident, and since the weight of fuel injected may be varied at will, it is plain that there is a considerable advantage attending the method providing the time of injection can be altered at will. It is easy enough to measure out the required weight of fuel, if a plunger pump is used, especially provided the packing question is well cared for and there is no leakage of moment. The length of the stroke of the plunger may be changed at will by means of a sliding cam motion, and if the cam is also given the ability to lag, or lead, which is but a question of supplying the necessary mechanism, just as is done with ignition systems; it then becomes possible to measure out the fuel, with great accuracy, alter the quantity of the same, at will, and fix the time of injection to suit the conditions. Under the best conditions the amount of gasoline required is about two per cent, by weight, of the total volume; but to attain flexibility, it is necessary to vary this ratio over considerable ranges.

Not only is this subject being discussed very thoroughly, but many experiments are being made with engines fitted with a fuel injection system. As these are tried out one by one, their success spurs other manufacturers on to try the same thing, and so the list of engines using the direct injection gains in numbers daily. Thus far, however, it is in the field of two-cycle motors that the greatest advance has been made. But the success there will before long have its direct result upon the more reliable and much more general four-cycle form.

AUTOMOBILE WHEELS, RIMS, AND TIRES

By Thos. J. Fay



depicts the wheel from the back, and Fig. 17 is with the wheel on edge, in order to depict the dish of the spokes, which is apparently very large.

The hub of this wheel was turned from a solid block of wood, is about 18 inches long in the axle plane, and the enlarged portion at the center is about six inches in diameter, dropping down to four inches at the approach of the two ends. The wheel is provided with six spokes, terminating in six felloe segments, and the tenons come at the joints of the felloe sections. The wheel is about 40 inches in diameter, and the tenons are nearly square, fitting into square sockets both at the hub and at the felloes.

Demountable Rims Invented by the Egyptians—This wheel is provided with an outer rim of bent wood, which serves as a tire, and since it is bound on by means of wrappings at six points around the periphery, with T-shaped slots provided in each spoke for the purpose, it has all the advantages of a demountable rim. This rim was evidently bent by artificial means, and that it

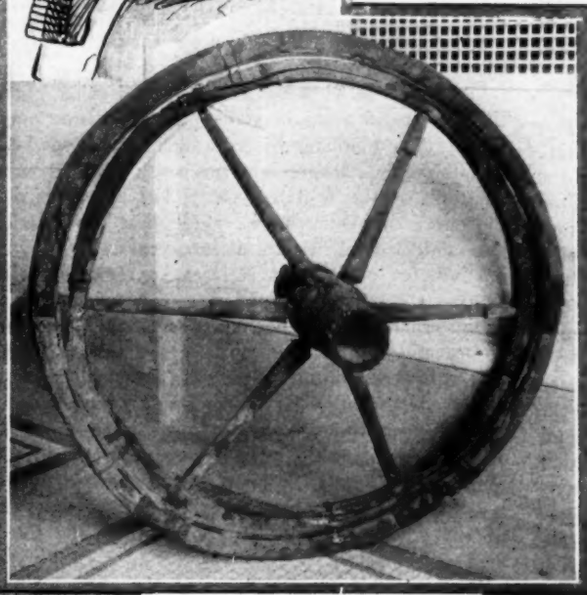


FIG. 15 FRONT

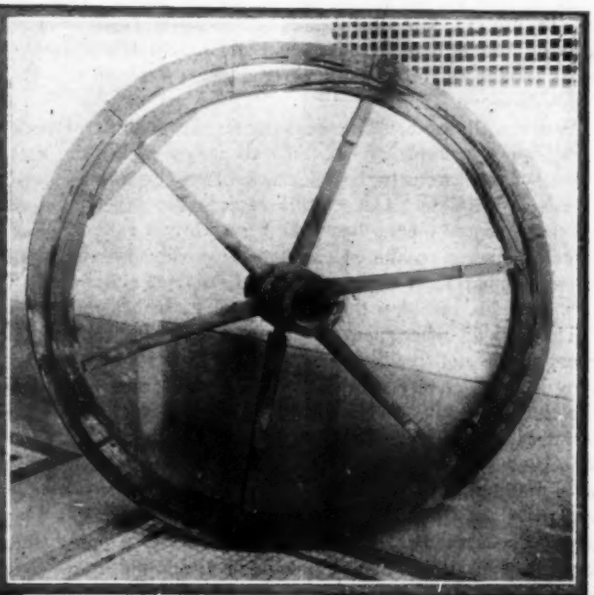


FIG. 16 BACK

THE NINEVEH WHEEL-EGYPTIAN

EGYPT, as a land of silence and mystery, indicates to the investigator with eyes to see the silence of consummate intelligence and the mystery which must ever remain in the maw of forgotten centuries. For over 30 years the New York Historical Society has had in its possession what is catalogued as the "Nineveh" wheel, which was taken from a mummy pit by Doctor Abbott, at a point near Dashour, in Egypt, which wheel upon examination proves to be the direct ancestor of all spoked wheels as they are now made.

The date of making of the Nineveh wheel cannot be exactly fixed, but Dr. Abbott estimated its age to be not less than 4,000 years, and the indications are that the date of interring of the once mortal, or mummy, was about 2000 B.C. The wheel is here shown in photographs taken especially for THE AUTOMOBILE by permission of the director of the New York Historical Society, and Fig. 15 represents a front view of the wheel; Fig. 16 could be removed and replaced at will is one of the evidences afforded by an inspection. In a word, then, the Egyptians used wooden tires and provided for their prompt replacement as the occasion required. This particular wheel was probably used on a chariot. The views given show the markings of great age, and that the wheel was much used before it was placed in the mummy pit by the ancients is scarcely to be believed.

FIG 17

What Went Before the Nineveh Wheel—What sort of

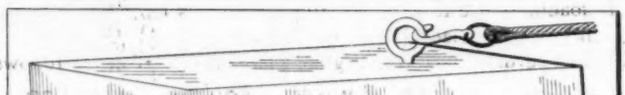


Fig. 18—Showing How Heavy Weights Were Once Moved

wheels, or equivalents, rolled over the causeway leading up to the Great Pyramid 4000 B. C. is not clear to us, but Fig. 18 represents a logical suggestion; brute force, so to speak, aided by crude ball bearings wrought out of the sands of the desert, probably did have something to do with it. Imagination, tuned up to the occasion, leads to the roller bearing system as depicted in Fig. 19, and from this point on to "Nature's own" wheel, as shown in Fig. 20, is but a step.

Modern Wheels Differ in Point of Detail—History, leading down through the halls of time, records the days of ornamental wheels, reaching their height during the seventeenth and eighteenth centuries, but these wheels were not dished, and they differed materially from the Warner or Sarven style of wheel of the present day in that the lion's face or other ornamentation is erased from the hub, but strength is substituted instead.

If the Egyptian invented the first wheel, it was the American who brought it out of its earlier stage, introducing all the features of strength, simplicity and utility, of which exact knowledge is now in the possession of wheelmakers. Take a wheel of the present, for illustration, and load it down, when, lo, it will be found that five tons will be safely borne by a wheel with spokes no more than three inches wide at the flange in the axle plane.

Wheel Diameter Represents an Important Point—The Egyptian wheel shown in Fig. 18 is 40 inches in diameter; wheels for extremely heavy trucks have been made even 100 inches in diameter, and in this respect the practice, depending upon the requirements, has varied over broad ranges. For automobiles, owing to the splendid service rendered by pneumatic tires, coupled with the cost thereof, diameter has fallen away to a low ebb, reaching the low limit of 26 inches in a few cases.

That small wheels, even below 32 inches, represent much economy is not readily proven by past performances. For a very light, relatively slow speed runabout, it may be that 28-inch wheels (measuring over the tires) will do very nicely, but the trend is back in the direction of the (former) large-diameter wheels, despite the finer qualities of modern tires, which rather goes to show that the cost of tires had more to do with reducing the diameter of wheels than any other one thing. This cost of tires is curing, and quality, which is also a point to be enlarged upon, is advancing about in the same ratio that cost is reducing. In this is seen a double advantage, which enables builders of cars to increase the diameter of the wheels, and in so doing augment the easy riding qualities of the cars, reduce spring troubles, and gain advantages in other ways, leading to longer life of the cars as a whole. This statement of the cost of tires does not contemplate any discussion of the moment, as the rise and fall of the rubber market and the relating incidents are too well known to require it.

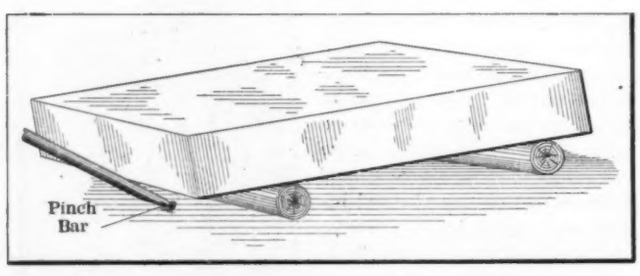


Fig. 19—Following Brute Force, Rollers Played a Part

In a general way the ability of a wheel is proportional to the square of the (section) diameter of the tire it will accommodate and to the circumference of the tire used. There must be a point beyond which this rule will fail to respond advantageously, since the centrifugal force, which will set up fiber strains in the tire, will increase with the diameter of the tire used, considering a given road speed of the car. That centrifugal force and its effect on the tire should be taken into account is quite as true as it would be of a flywheel for the motor or any other revolving mass. The right diameter of a wheel then involves all the conditions, as follows:

(A) Diameter of the tire in proportion to the height of road obstructions it will have to surmount.

(B) Section of the tire in proportion to the road debris it will be expected to "swallow."

(C) Section of the tire in proportion to the load it will economically sustain in actual service.

(D) Diameter of the tire as it relates to the load to be sustained.

(E) Diameter of the tire as it relates to centrifugal force.

(F) Weight of the wheel as a whole in view of flywheel effect on the car.

(G) Weight of the wheel as a whole from the point of view of gyroscopic action.

(H) Diameter of the wheel, taking into account the difficulty involved in removing and replacing tires.

(J) Diameter of the wheel, considering resilience, allowing that as the tires are reduced in this property, the wheels must make up for the deficiency.

(J) Diameter of the wheel as it affects cost, taking into account the cost of tires.

Obviously, in view of all these, and other conditions besides, there is justification in going slow, and time only will measure the ultimate diameter of tires such as will spell finality in automobile work. Progress in this work dates from the reign of a Pharaoh of the fourth dynasty, but the upward ascendancy of the curve of progress has taken most rapid strides toward the long-sought goal within a few years.

Diameter of Wheels Relates to Height of Road Obstructions—If a wheel encounters an obstruction equal to its own radius, there is no tendency to surmount, because the resolved forces must be summed up as a problem in impact calculations of the first magnitude, in relation to which it would be of small advantage to pursue a further investigation, since the car would have to go in any but the forward direction. But there is some angle of impact which may be encountered with impunity, which angle will be nearly the same for all wheels of whatever diameter, but the higher the obstruction the greater must be the diameter of the wheel, in order to come within the fixed (maximum) angle of impact.

It is possible to consider that the versed sine of the angle of impact of a road obstruction with a wheel, allowing for pneumatic tires, will be allowable when the versed sine is some proportion of, but less than, the section diameter of the tire, which proportion, in turn, will depend upon the area of the section of the tire and the speed of the car, considering a given blow struck. In thus reasoning, it is necessary to take into account the nature of the roadbed over which cars must roll, but, after all, this is one of the prime requisites, and the proof lies in every effort at road building, since if cars could be made to negotiate Naurres byways, road building would languish.

Tires Swallow Small Road Debris—There are two ways of annulling the ills of small road debris, and speed may be increased in proportion to the versed sine of the angle of contact of rigid tires with such debris, or if pneumatic tires swallow the debris, speed may be increased up to the point where the debris becomes too large for the tires to swallow. In the absence of pneumatic tires, increasing diameters of wheels allows of increasing speed from this point of view, simply because the angle is reduced. The mere employment of pneumatic tires will not eliminate the tendencies, and, in a general way, increasing

the diameter of pneumatic tires will allow of increasing speed, independently of the ability of the tires to swallow the debris. With pneumatic tires the gain is a double one, however, primarily due to the natural advantage of large diameter wheels, and, again, in view of the ability of the large tires to swallow the small, road obstructions.

Centrifugal Force Limits Diameter of Wheels—In the list of conditions which affect wheels, C and D remain as tire problems, and will be reserved for discussion later. The condition E, however, is abstract, since it affects wheels, no matter of what material they are made. In a cast-iron flywheel, when the rim speed is one mile per minute, the stresses set up in the section of the iron are all that it is safe to engender, if a factor of safety of suitable magnitude is to be retained. It is not in wood that danger is to be encountered when reference is had to flywheel effect, since in wood the rim strains is materially reduced, owing to the specific weight of the same, in view of its ultimate strength. For a given rim speed the extreme fiber strain is in proportion to the specific weight of the material used. The weight of ash, for illustration, is 34 pounds per cubic foot,

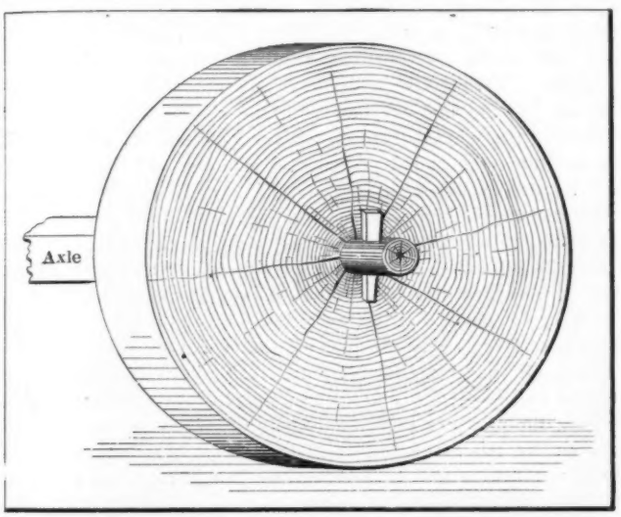


Fig. 20—From Rollers to Solid Wheels Was a Natural Step

whereas cast iron weighs about 450 pounds per cubic foot. In view of the relations, it has been determined that an ash rim will compare with cast iron for safety when the speed is increased to:

$\sqrt{10.58} = 3.25$ times the rim speed of cast iron.

The steel rims, as used with pneumatic tires, are not nearly so capable as the wooden felloes, so that the danger to be encountered, contrary to the usual expectation, is in connection with the steel rims rather than with the wood.

In flywheel work the rim is supported by the arms, which is not true when automobile wheels are considered, since the rims are not held by arms, unless account is taken of security bolting, which is frequently a negligible quantity. Considering steel, of which rims are made, centrifugal force (not counting the weight of tires) will tend to part the rim, one half from the other, and resistance is offered by the rim at each end of the diameter. The rim strain will be:

$S = 0.0000294\ V^2$

when

S = extreme fiber strain in pounds per square inch;

V^2 = square of the rim speed in feet per minute.

The above takes no notice of the weight of the tire, which loads the rim, since it is incapable of supporting its own weight, and an allowance must be made for this loading.

The extreme fiber strain is quite independent of the sectional area of the rim, so that the calculation assumes simple proportions, if only the speed of the wheel is known and its diameter is fixed, barring the error which is likely to follow if the weight of "loading," due to the weight of the tire, is not known exactly.

The limit of speed in revolutions per minute, considering different tire diameters, for a given maximum will be as follows:

MAXIMUM DIAMETER OF WHEELS FOR A GIVEN RIM SPEED

Revolutions per Minute	Diameter of Wheel	Speed in Miles per Hour	Rim Speed in Feet per Minute
672	30	60	5,280
612	33	60	5,280
560	36	60	5,280
480	42	60	5,280

It is not claimed that the rim speed above given will endanger the rims or the tires, but it may be well to consider that the strain is proportional to the square of the velocity, and double the above speed means that the strain will be multiplied by four. Just what will be a safe rim speed is yet to be determined, but the extreme fiber strain in the steel of the rim at a rim speed of 60 miles per hour will be:

$S = 5{,}280^2 \times 0.0000294 = 819.6$ pounds per square inch.

The above value, not counting the effect of "loading," seems to be well within the limits allowed for steel, and experience seems to prove that rims do hold out, even at double this speed, which is attained in racing. In the meantime, since speed imposes strains in a manner not usually considered, it may be well to ponder over this phase of the subject from the point of view of tire depreciation when cars are going fast on a hard, level road, and wheel depreciation when roads are not level, even if the speed is considerably reduced. Finally, with a method of reasoning sufficiently clear for the purpose, individual cases may be investigated with a view to ascertaining the factor of safety.

Weight of Wheels Must Be Considered—There are two ways of looking at the question of the weight of road wheels for cars—a, if flywheel effect is present to a noticeable effect it reduces the flywheel requirement, and, b, at high speeds of the car, if this same effect excess is in the road wheels, steering around curves will be attended by some approach to danger. Gyroscopic action, in so far as it is due to flywheel effect, will be present, no matter in which of all the members, the flywheel effect is induced, modified, to be sure, by the plane of the axis of rotation, so that each case would have to be investigated on individual merit. In the meantime, to whatever extent flywheel effect is necessary to the motor, it may best be supplied by a flywheel proper, because the speed of the motor crankshaft is higher than the speed of the road wheels, and greater flywheel effect may therefore be supplied with a lowering of the total weight of the car. Regarding the condition H, as before referred to, enough is to say it will be better to discuss sizes of tires and rims at the one time, a little later on. Resilience, as this property is tied up in diameter of wheels, is best represented in high-wheel cars using solid tires. That the high-wheel cars work very well is due to the resilience of the wheels, which property comes in through the use of long spokes, in which spring effect is most noticeable, and the amount of this action within limits is proportional to the cube of the length of the spokes.

That this resilience is destroyed when pneumatic tires are used is far from true, and this point alone augurs for wheels of considerable diameter, rather than the reverse. To whatever extent it may be possible to impart to wheels the property which makes it unnecessary to use pneumatic tires, also imparts longer life to the tires, since the amount of work they will have to do will be accordingly limited.

This point is one which might be well thought over by many otherwise promising inventors who are attempting to develop spring wheels. The one feature which all these wheels have in common is that they directly turn their backs upon this principle. No spring wheel has yet appeared on the market which was not heavier than the ordinary wheels, and of which the design was not such as to destroy every particle of natural resiliency which the wheel might have possessed in its original form. In this way the designers of these wheels were in reality adding to their task with each step they took. On the whole, it seems probable that the problem will work itself out gradually without making necessary any revolutionary changes.

(*To be Continued.*)

SOME CONVENIENCES IN THE OWNER'S GARAGE

PROFESSIONALS, if they deny themselves such facilities as would seem to be in keeping with progressive methods, make up for the deficiency by diluting their backwardness with skill. In the owner's garage an overcharge of skill is scarcely to be expected, and to trot to a repair shop every time some little thing happens is to run up a repair account which is likely to lend to autoing a reputation for cost, which is outside of the actual necessities.

If a nut is rusted in and fails to respond to a reasonable amount of pressure surely a can of kerosene oil may be ready to hand, and a little of the fluid, if it is spilled over the refractory nut, will loosen it in a little while; excess pressure, on the end of a long Stillson wrench, will, more likely than not, wrest the nut—with a part of the bolt clinging to it—from its home, and serve as the signal for a trip to a repair shop.

When a stud backs out during an attempt to take off the nut, to disregard the condition which underlies the incident is bound to lead to the loss of the stud and with, perhaps, the member the stud is placed to hold, and, rather than the resulting inconvenience, it is better to have in the garage a small quantity of hydrofluoric acid, a little of which, if daubed over the threads of the stud before screwing it back into place, will cement it into intimate relation and assure that it will remain where it belongs.

Rims, even if they are well coated with "japan" and baked will, in time, be attacked by rust, and, as the makers of tires are wont to say, rust is the bane of the fabric. In the owner's garage it is scarcely to be expected that facilities will be available for use in baking on japan, and there are no grades of unbaked japan that will stay on after rust forms on the rim. Fortunately, it is possible to cope with this problem, inasmuch as bees'-wax combines with rust and forms a new compound which prevents the further formation of the same. This same bees'-wax serves very well as a substitute for properly applied japan, and it may be easily put on, heating the rim, using a blow torch for the purpose. When this rim is heated sufficiently the bees'-wax may be spread over the rusted surfaces.

Strong Springs Render Valve Grinding Difficult—In some of the larger sizes of motors the valve springs are compressed to from 40 to 50 pounds, and in view of the cramped space in which they are nested many motorists prefer to have the valves ground in at a garage. A little experience of this kind generally leads to a period of leaky valves, rather than stand for delay which naturally results from placing a car in a busy garage, and the cost, which is frequently augmented by having other, and probably unnecessary, work done—a condition which is brought about by the mere delivery of the car into the hands of a repair man. True, every car should be kept in good repair, yet, even so, it is not good practice to make two bites of a cherry, and there is a class of repairs that can be deferred until the time when general overhauling is indicated by the condition of a car. Fig. 1 shows a spring puller of simple form, and by its use the spring may be compressed with but small effort, thus rendering valve grinding a relatively simple matter.

Keys Are Difficult to Remove—Unless keys are "driven home" they are likely to drift out at an unpropituous moment, and they will fail to do the work for which they are placed. When they are properly fitted, to remove them is more of a task than the average motorist is likely to admire, and Fig. 2 is offered as indicating how a key may be removed if in fashioning it the end is up-turned in order to allow of the placing of a "drift" piece and enable the mechanic to apply pressure in the manner as shown. Frequently, when keys are not properly fitted, they bear on the top and bottom, with the result that it is difficult to remove the wheel, drum or whatever it may be, but when the key is drawn the radial pressure is relieved and the drum may then be driven off with ease.

When a key has been taken out even two or three times, it is a question if it will then be valuable for future use, and while it may be peened to a new bearing thickness, and then refitted, even so it is better to have a little key stock on hand and fit a new key in place. In fitting a key, careful work will furnish its own reward; and, remembering that it is side pressure that is wanted, all that remains is to taper the key slightly, say 1-16 inch to the foot, and have a true bearing all along the faces. Blueing the pressure faces of the key will enable the mechanic to note, by trial, how tight it will fit by trial, and how well the face-bearings will be. When the key is ready to insert for the last time, it should drive nearly home with but relatively little effort, but the last part of the key, say for 1-2 inch, should resist with considerable tenacity. If the hub is of cast iron, and the shell is thin, it will be well to have a care in order not to split the hub, which will be a simple thing to do, in view of the slight taper of the key and the tremendous pressure it is capable of exerting. The lever advantage is in the ratio of 192:1 when the taper is 1-16 inch to the foot.

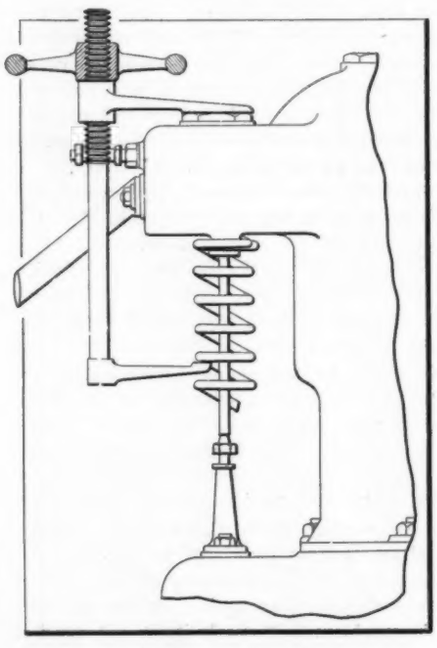


Fig. 1—Spring puller of simple form

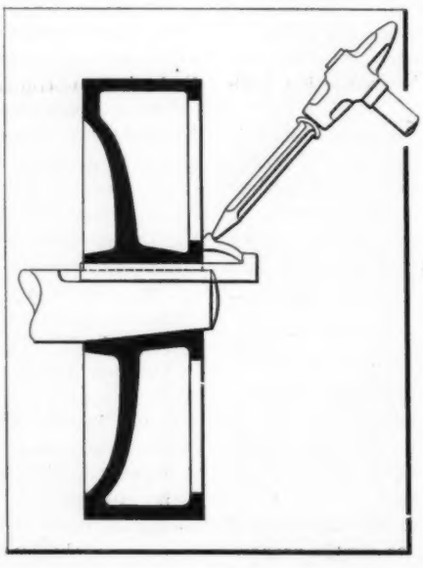


Fig. 2—Showing how key is removed

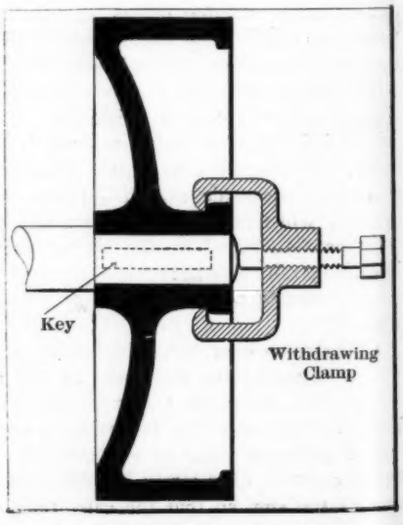


Fig. 3—Pull-jack of simple design

MERITORIOUS FEATURES OF WIRE WHEELS

By Joseph A. Mackle

IN the early days of the history of the automobile, solid-tired wire wheels were standard practice, and for the low powers and low speeds of those times the wheels gave satisfactory service. Less success was experienced when speeds increased, for owing both to too light construction and to undue imitation of the bicycle form of wheel—which, as shown below, is quite unsuited for automobile work—wire wheels gave considerable trouble and were soon replaced by artillery wooden wheels of the present day type.

One British car, however, had wire wheels of suitable design and shape even at that early date. This was the Lanchester, whose designers have seen so many of their distinctive ideas first ridiculed and afterwards generally adopted. Such matters as three-point suspension, forced lubrication and worm drive of rear axle are all general developments of Lanchester practice, and, in passing, the opinion may be hazarded that further Lanchester features of tiller steering, wick carbureter, epicyclic gearing and uncanted front wheels are likely to find a good following in the near future. This reference to Lanchester practice is evoked by the fact that it was the excellence of the results given by those wire wheels that led the directors of the Rudge-Whitworth firm to study the advantages of this form. After lengthy experiment on the part of this great bicycle concern, the first Rudge-Whitworth wire wheels were fitted to the 90-horsepower Napier—the earliest six-cylinder racing car—which appeared in the British eliminating trial for the 1905 Gordon-Bennett race. The wheels showed their value by standing up when MacDonald skidded at high speed against the curbstone at Ramsey corner; but a still better proof was afforded later by Earp's 100-mile record ride at Ormond Beach, when he covered the last 63 miles on the rim, while in spite of this, the average speed was nearly 90 miles per hour.

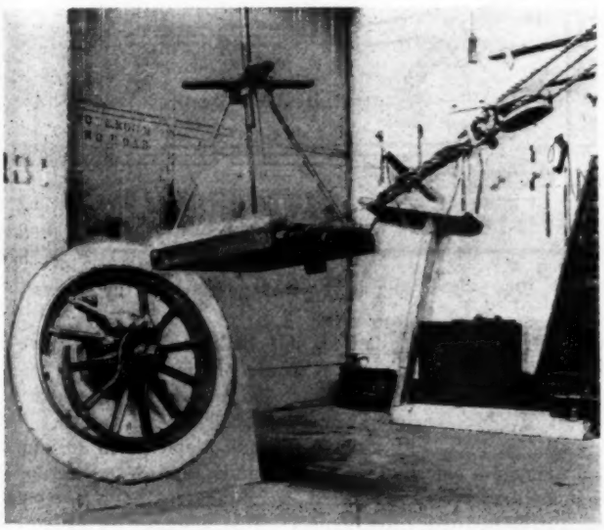


Fig. 1—Apparatus used in testing wire wheels

Such incidents showed the value of the wire wheel, and undoubtedly its popularity was assured, even if progress were slow. Meanwhile, however, the detachable rim had been extensively introduced for Continental races, and this suggested a detachable form of wire wheel. When the Rudge-Whitworth detachable wheel was at length placed on the market it immediately jumped into favor. Almost every make of car has been fitted with the wheels for special orders, while for this season the leading British firms—Daimler and Napier—fit Rudge-Whitworth wheels as standard on all their cars.

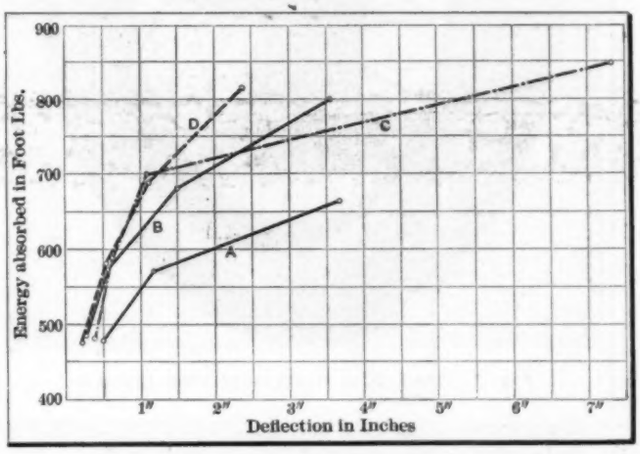


Fig. 2—Graphical showing of result of the first test

Edict Forbidding Their Use Proves Their Worth—Possibly the widest possible publicity obtainable was given to the wire wheels by the refusal of the Commission Sportive to allow the Napier cars to use these fittings in last year's Grand Prix race at Dieppe. Under these circumstances, S. F. Edge withdrew his cars, and his action was endorsed by the failure of several of the French cars through defective detachable rims. The embargo on the detachable wheel was withdrawn after the race, but as there has been no big European contest since then, the wheels have not had an opportunity to demonstrate their superior value in this very severe service.

The advantages of the wire wheel lie in its strength and lightness, while equally obvious are the special benefits accruing from the detachable form. A change of wheel can be made inside the space of ten seconds—this, of course, exclusive of the time occupied in jacking up the wheel axle. This ease of changing is not only of service in case of a puncture or blow-out, for by

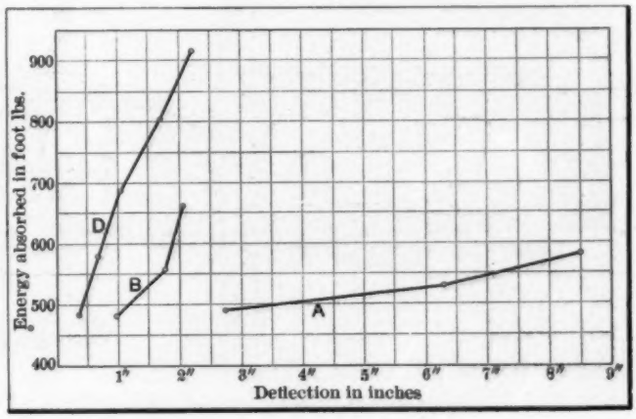


Fig. 3—Second test showed wire wheel superiority

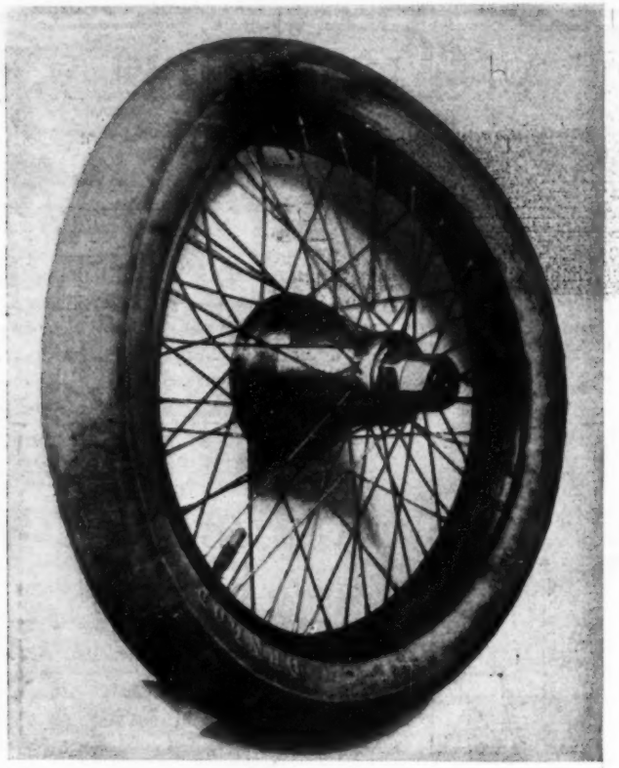


Fig. 4—Wheel B as it appeared after the test

carrying a couple of, or even one, spare wheel with studded tire, the car becomes equally prepared for wet roads or dry.

A set of 888 x 120 mm. wire wheels weighs about 50 pounds less than the corresponding wooden artillery wheels, and the lessened weight of rim seems to have a saving effect on the tires. Particularly is this noticeable on rough roads through the absence of pounding. The greater ease of cooling through the rim serves in a notable degree to prevent the tires from becoming unduly heated at high speeds. Extremes of temperature and climate exercise an extremely deleterious effect on wooden wheels, however well the timber has been seasoned, and for this reason in particular wire wheels are now specified on all British cars required for export to the colonies. Wood is beginning to be reckoned an unreliable and unsuitable material for standing the abnormal stresses to which every automobile part is subjected, and following on its early abolition from the frame, wood has given place to steel, aluminum, and pressed steel for body work, and it is now being succeeded in most cases by steel wire for the material of spokes used in the road wheels.

In view of the fact that the strongest claim made for the wire wheel is its ability to withstand a side blow, such as would be occasioned by a sideslip against a curbstone, it is interesting to refer to certain tests made at the Rudge-Whitworth works under the observation of disinterested experts.

Disinterested Tests Prove Claims Beyond a Doubt—A heavy weight was suspended by a rod from the roof in the manner of a pendulum, in such a way that with the rod in a vertical position the weight rested against the rim of the wheel to be tested, while the wheel itself was supported on a dummy hub. The pendulum was then drawn up to a predetermined height and suddenly released, so that a heavy blow was given to the rim of the wheel. Successive blows increased in magnitude, and the results are shown graphically in Fig. 2. The wooden wheels indicated at A and C were greatly distorted after the first two blows, and at the fourth blow, wheel C collapsed altogether. The wire wheels B and D show only a slight advantage over the wooden wheels for the first blow, but subsequent heavy impacts have comparatively small effect, and even with the maximum deflection that was produced, the rims retained their circular shape to a considerable extent, so that they would still be capable of supporting the weight of the car. A further test of the three wheels was made by striking the rims at a point diametrically opposite to that of the first experiment. The wooden wheel, A, quickly collapsed, but both wire wheels gave substantially the same figures as in the previous test.

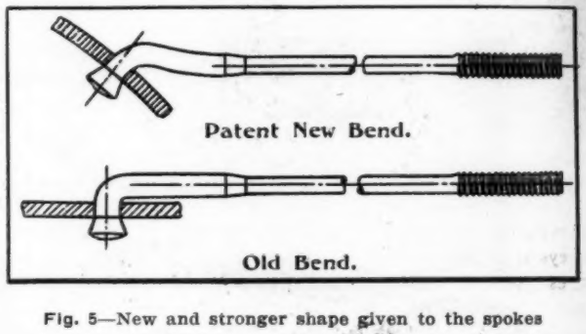


Fig. 5—New and stronger shape given to the spokes

Experiments of this kind have led makers to guarantee that a wheel of 888 x 120 mm. size (practically 4¾ x 35 inch), weighing 20¼ pounds, with rim, spokes and nipples, will sustain without damage a side pull of 6,000 pounds applied at the rim. The best artillery wheel yet tested, weighing 31½ pounds, would not sustain more than 4,500 pounds. This amounts to an advantage in strength (guaranteed) of 33 per cent. in favor of the wire wheels which are over 35.7 per cent. lighter in weight.

Regarding the construction of the Rudge-Whitworth wheels, the two rows of spokes are not yet symmetrical, as in the case of a bicycle. The stresses set up in a car wheel, particularly when rounding a corner, are very much greater from the outer than from the inner side of the wheel. For this reason the wheels are considerably dished, so that the outer spokes follow a much sharper cone than the inner. This displacement of the center line amounts to ⅞ inch in a wheel size 888 x 120 mm. Furthermore, in the case of driving wheels, the outer spokes are made tangential to a much smaller circle than the inner spokes, so that the latter take the major portion of the driving stresses, leaving the outer spokes free to resist the side stresses.

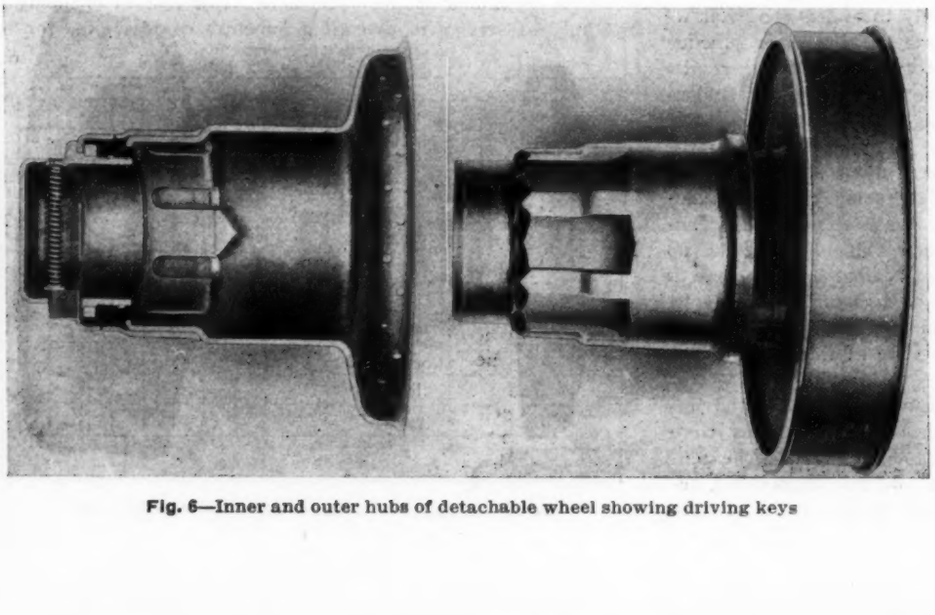


Fig. 6—Inner and outer hubs of detachable wheel showing driving keys

Improved Spoke Shape Increases Strength—In an 888 x 120 mm. wheel, which is the most popular size, there are 60 spokes, these being equally divided between the inner and outer rows. The spokes are made of 8 gauge (British) steel wire, swaged to 10 gauge at the centres. The heads are bent only through 45 degrees instead of 90 degrees, as usual. This simple alteration, shown in Fig. 5, has been found to decrease very greatly the liability of the spoke heads to break away owing to vibration, and, as a matter of fact, this construction leaves the metal with 90 per cent. of its ultimate strength in place of the 75 per cent. that the 90-degree spokes have.

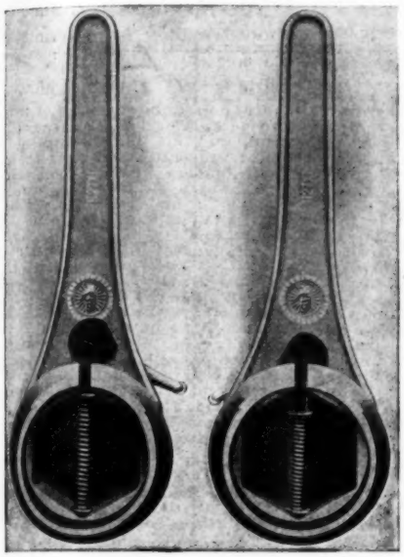


Fig. 7—Two views of spanner used on Rudge-Whitworth Wheels

The construction of the detaching mechanism will be evident at once from a glance at the illustration. The inner hub takes the drive in the usual way, it being immaterial whether this is by shaft or by side chains. This hub also carries the brake drums, speedometer rings, and other like fittings. Integral with the body of the hub are eight projecting keys, milled up out of the solid. The hub of the wheel itself consists of a shell which is internally grooved so as to make a sliding fit with the keys of the inner hub. A triangular pilot piece in the hub shell insures that the keys shall enter into the slots straightway, no matter in what position the wheel may be pushed on to the hub. When the wheel is in position the hub cap, which is permanently secured to the wheel, is screwed up by a special spanner until the wheel is felt to be securely home. The small lever visible in the illustration of the spanner is then thrown over, and a pawl, which has hitherto been held out of action, is now released and engages with a notch in the hub, securely locking the whole arrangement in place. Until this pawl has been released by the lever, the spanner cannot be removed from the cap, so that it is impossible for anyone to forget to make use of the locking device. Several other arrangements of locking pawls have been employed, but all work on similar lines to the above; for example, the latest wheels have a simple ratchet internally cut round the edge of the wheel hub and a spring pawl on the lock nut. When the wheel is in position no backward movement of the cap is possible till the spanner is used to depress the pawl.

Rudge-Whitworth detachable wheels are now only made in wire, although the detachable principle could as easily be applied to artillery wheels, and, this has been done in a few isolated cases.

Use Not Confined to One Firm, but Is General—Several other firms have recently introduced types of detachable wheels, usually both the wire and the wood forms being supplied. The Humber wheel is probably the best known, and is locked in place by a screwed cap with a spring locking device, shown in Fig. 8, and consisting of a spring actuated bolt which connects the hub cap to the wheel proper unless held out of position by the special withdrawing spanner. These had the test of racing experience in several Tourist Trophy races before being accepted.

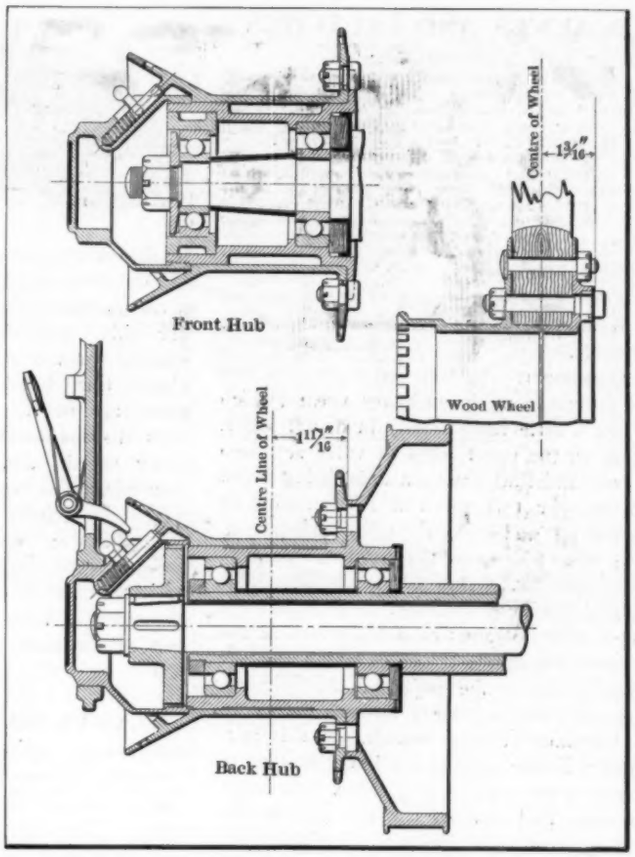


Fig. 8—Construction of the Humber wheel, which is new

Other British detachable wheels are the Riley and the Harper. Both these are similar in construction to the Humber, and are fitted respectively to the Riley cars and to the S. C. A. T.—an Italian make somewhat popular in this country (England).

22-Horsepower Daimler with Silent Knight Engine and Rudge-Whitworth Wire Wheels

VALVES AND CLUTCHES

Editor THE AUTOMOBILE:

[2,002]—Will you kindly inform me through "Letters Interesting, Answered and Discussed" as to the following matters:

1. How does the slide valve spoken of in Letter 1,982 differ from the ordinary?
2. How does a coil spring, Mercedes type of clutch, that was used on the Maja car in the Briarcliff Cup race, differ from the cone clutch as used on the Renault car?
3. Which do you consider the best—the three or four speed transmission?

W. I.

Santa Ana, Cal.

Your questions are rather broad, yet we will attempt to answer them as well as possible.

Question 1. The slide valve there spoken of differs from the ordinary valve (which is not a slide valve at all) in that it slides. That is, the usual form of valve sets into a seat and thus covers a hole, being lifted to uncover this when it is necessary to admit or discharge anything through it. The slide valve, on the contrary, consists of a circular, hollow sleeve, which slides up and down continuously. In this there are cut a series of slots or ports, which at the proper time in the stroke cover or uncover other ports in the walls of the cylinder, thus affording a passage through the sleeve and cylinder to the outside. In this particular engine we do not know any more than you do what form of valve is used, but presume that it is of the rotary type, the action of which is similar to the slide valve, except that it rotates continuously instead of reciprocating. There is this difference between the two, however: the slide valve, just like any other valve which is moved up and down, must be driven at half of the crankshaft speed, while on the rotary valve other speeds may be used, according to the desired action of the engine. Thus one engine which was built with rotary valves had them rotate at one-fourth of the crankshaft speed.

Question 2. Although there is apparently much difference between the coiled spring clutch and the ordinary cone clutch, it simmers down on close investigation to the same thing. There is this minor change, however, that one uses a steel spring for a contact surface, and an interior cone as well as the usual exterior cone. The Renault type, on the other hand, uses a leather lining, or leather and cork. It would appear as if the use of the coil spring interposed between two cone surfaces would give double the clutching surface, and therefore could be used with a spring of half the usual strength. This would make declutching easier and more gentle.

Question 3. This question is too broad to be answered directly, but we can say that the two seldom conflict, one being used for one purpose and another for another. Thus all of the very highest powered cars, which might reasonably be described as those of highest speed as well, are fitted with four speeds. This is due to the fact that with such a large moving mass both a much slower speed than usual and a much higher ratio of gearing on the high speed are necessary. This makes it advisable to add one to the number of speeds in the gear box. On the other hand, the medium priced and more moderately powered car has no need for either very high or extremely slow speeds, for the class of people who purchase this kind of car, in doubtful cases, are not afraid to stop the engine. This dispenses with the necessity for so many speeds, and as a consequence the transmission is smaller, more compact and lighter in weight.

In the very few cases where moderate powered cars may be had with four speeds or high powered cars with but three, it is a matter of individual preference on the part of the constructor.

WANTS TO BUY TRACTORS

Editor THE AUTOMOBILE:

[2,003]—We are interested in gasoline tractors for pulling gang plows and doing other similar agricultural work, and although from time to time have seen cuts of such machines, do not know the addresses of any successful ones. If you have such addresses, we would be pleased to have you publish this information. H. & COMPANY.

Sumter, S. C.

Although we cannot give you a complete list of such makers, nor guarantee that any list given would include only the successful ones, we are appending a list which includes nearly all of the competitors at the recent agricultural machinery competition at Winnipeg, mentioned in detail elsewhere in this issue. In this list they are arranged in about the order in which this contest and others would place them as to merit:

Kinnard-Haines Company, Minneapolis, Minn.
Hart-Parr Company, Charles City, Ia.
International Harvester Company, Chicago.
J. I. Case Company, Racine, Wis.
Russell & Co., Massillon, O.
The Avery Company, Peoria, Ill.

HIGH TENSION VOLTAGE

Editor THE AUTOMOBILE:

[2,004]—Will you please let me know through "Letters Interesting and Instructive" approximately the voltage of a high tension current as used in modern jump spark ignition systems, both from an induction coil and batteries and high tension magneto. R. G. McCREIGHT.

Camden, S. C.

The voltage at the moment when the spark jumps may attain any figure between 10,000 and 15,000 volts, inclining somewhat more toward the lower than the higher figure. Porcelain walls of spark plugs will not withstand more than the upper figure, so it is very reasonable to keep below it. These figures apply equally well to the self-contained magneto system, that is, the magneto which is a complete system in itself, and to the battery and coil system, in which the current from the battery is stepped up in voltage by the coil.

AIR OR WATER, WHICH?

Editor THE AUTOMOBILE:

[2,005]—I would like to ask you, entirely as a matter of information, why it is there are so many water-cooled gas engines in automobiles and so few of them air-cooled. As I understand it, the most efficient temperature for economic gas combustion is acknowledged to be 350 degrees. Water cooling will not permit of this high temperature, and the thought presents itself that the use of expensive radiators, pumps, plumbing, etc., creates a hazard in freezing weather, and adds cost, weight and complications simply to defeat the fundamental economies of that type of engine.

Am looking for general facts and not commercial argument. I know of air-cooled cars that have been in use for many years with great economy and perfect satisfaction. I know it is possible to make an air-cooled engine that will not heat up excessively when running either high or low gear and when touring or standing still. I believe these engines require very little more lubrication than other cars, and will only smoke when too much oil is used. If these facts are so, why do the majority of cars use the unnecessary water system of cooling?

D. C. N. C.

New York City.

Your first statement that "the most efficient temperature * * * is acknowledged to be 350 degrees" is susceptible to proof; that is, this is *not* acknowledged—in fact, just recently, page 273, August 12 issue, there was published the tabular results of one accurate test, made by S. F. Edge, in England. Consulting this, you will discover that he found the most economical temperature, both as to power and fuel consumption, to be 149 degrees, both 186 and 212 degrees showing less power developed and more fuel used. This result was somewhat astonishing to the writer when first published, for his own experiments had led him to believe the most economical temperature to be about 200 degrees, or as close to the boiling point as it was possible to run the engine. Laying all this aside, the popular, or, to put it otherwise, the most general idea seems to be that the water-cooled motor offers more in the way of reliability. As indirect proof of this, it may be said that the estimate of the cars which will be produced during 1910 is 200,000. Of these, not over 10,000 (which is, incidentally, a very high estimate) will be air-cooled. This amounts to one-twentieth, or 5 per cent. Worded otherwise, 5 per cent. of the people who buy and run automobiles prefer air cooling, while the other 95 per cent. seem to prefer water. If one can judge fairly from the number of firms concerned in making the two kinds, the air cooler is on the decrease, for several concerns wedded to this construction have gone out of business in recent years, and more have turned to the other type. They doubtless were unchanged in their faith in the ability of air, but failed or changed for the reason that public preference made the other kind easier to sell.

ANSWERED AND DISCUSSED

GAS TURBINE INVENTION

Editor THE AUTOMOBILE:

[2,006]—The following are a few queries which I will be greatly obliged if you will reply to in your column "Letters Interesting, Answered and Discussed:"

I have recently worked out improvements in the two-cycle engine and gas turbine combined, and though I have come across nothing of the same nature, I cannot but think that I have been anticipated. Before going to the expense of having searches made, I would like to be able to look up recent development in this line, and would be glad to have you advise me where I can obtain either a concise account of recent improvements (including those in practical operation) or various articles bearing on the subject. That is, either a complete book or a series of separate articles.

I presume an application to the Commissioner of Patents for all existing patents would cost as much as a special search. Can you recommend the patent department of any paper, or any firm or party who make such searches at a reasonable charge?

TURBINE.

Half Way Tree P. O., Jamaica, B. W. I.

There is a book published on patents (it now comprises several volumes), these being restricted to those applicable to the automobile, either directly or indirectly, which might be of some use to you. The title is United States Automobile Patent Supplement, and it is published by some book firm in New York City. You might apply to the Class Journal Publishing Company, 231 West 39th street.

This does not contain anything of a practical nature; in fact, no book on patents does. It seems to be impossible to treat the two sides of invention—that is, the patent and the practical sides—at one and the same time. The fact of the matter is that a man fitted to pass on the patent side seldom knows or cares anything about the practical or operating side, and vice versa. There are no separate articles of this sort that we know of, either.

We never recommend any firm or private party in these columns. As to getting the patent papers direct from Washington, this is more simple and less expensive than you seem to think. The charge is but ten cents per paper, and the Patent Department sells stamps of this value, which may be bought in quantity, and used at leisure, one at a time or otherwise. The thing for you to do is to buy, say, $2 worth of these and send in for a list of subjects, which we believe is furnished free. Then select the likely subjects and send in stamps enough to cover the number which you wish to obtain. The Patent Office will not make a search for you, nor would it fill such a broad order as "all existing patent papers" on any one subject.

In case you go to a patent attorney you may judge whether he is charging you much or little by the amount which his fee exceeds the Government fees. The latter amount to $35 and are invariable. The attorney to whom you go will either make you a lump price for the whole job, in which case he pays all fees, or he will tell you what his services will cost, in addition to the Government fees.

Doubtless preceding letters on the same subject will be of interest, so a list of those which touch on this matter is given. In the issue of THE AUTOMOBILE for Feb. 4, 1909, will be found a letter entitled "Wants to Know If the Idea Can Be Patented," about patents, and taking out one. Then, in the May 27, 1909 issue, there was a letter headed "Gas Turbines," in which a contributor was given some idea of the existing types, with sections through two of them. Also, a brief mention of the literature on the subject. Lastly, in the June 24, 1909 issue, a letter under the caption "Gas Turbine Prospects," dealt with the matter of cooling the blades.

WAY TO CLEAN CYLINDERS

Editor THE AUTOMOBILE:

[2,007]—Many instructive questions and answers appear in your "Letters Interesting," and I wish a word with you. I have recently been experimenting in cleaning spark plugs, when very much sooted, by making a solution of concentrate lye and water, and let the plugs remain in it over night; the next morning the soot and carbon can be wiped off with a rag, and the metal part is about as clean as new.

The question arises, can this solution be used in cylinders to remove a coating of carbon; is there anything in it that will injure the iron? It certainly cuts out the carbon and softens the deposits on plugs.

C. W. W.

Delaware, Ohio.

Yes, this same solution could be used, but since the interior walls of the cylinder have a very smooth finish, obtained at much expense by the manufacturer, it would not be advisable to let the solution remain in there over night, as you do in the case of the spark plugs. A concentrated solution would probably attack the iron itself, besides destroying the finish, but a very weak solution would do little in the way of eating into the metal. The worst thing that would happen is that the water would rust the interior of the cylinders badly, and this would have to be removed before running the engine again, else you would be likely to lose pistons and rings, as well as cylinders, as against cylinders only. You have not asked for our advice, but if you had we would say do not use the solution.

A recent suggestion in the way of cleaning carbon from the cylinder walls may be appropriate here. This was to place in the suspected cylinder one of the soft wire chains used around the kitchen. With this in the cylinder, run the engine for a short time and the carbon will be broken loose.

WHY FAVOR TWO-CYCLE?

Editor THE AUTOMOBILE:

[2,008]—I have been watching the columns of "The Automobile" for years, hoping that you would eventually, though tardily, acknowledge the superiority of the two-cycle motor, as exemplified by the product of the Elmore factory. I speak of the Elmore because of nearly two years' experience with a three-cylinder 24-horsepower car, and I am in a position to know of the great efficiency of this engine.

No motor, whether it be two or four-cycle, scavenges completely, possibly a six-cycle might do so. There is always a small amount of burnt gas remaining in the cylinder, but this residue of the burnt charge does not dilute the fresh charge as stated in your answer to letter 1,986. The fresh charge and the burnt gases do not mix readily, and the small portion remaining in a two-cycle is not important except that it goes to disprove your statement that the two-cycle motor is wasteful of fuel, allowing it to escape with the exhaust.

The deflector on the piston turns the fresh charge toward the top of the cylinder, pushing the residue of the burnt gases ahead of it to the exhaust port.

As these fresh and burnt gases do not mix, and as there is a small amount of burnt charge remaining in the cylinder when the piston closes the exhaust port, it follows that none of the fresh gas has been wasted, as it could not pass through the residue of the exhaust lying against the exhaust port, and effectually blocking the passage until the same is closed by the rising piston.

Another point that makes for efficiency in the Elmore two-cycle is that the compression space is small, compact and perfectly tight. An Elmore motor does not lose compression after a year's service, the perfect lubrication takes care of that most effectually. An Elmore motor does not smoke, and you can test the perfection of the oiling system by holding your handkerchief at the end of the exhaust pipe, remove it and it will remain as clean and white as before the experiment.

Try this test on some of the four-cycle smoke motors on cars selling as high as $5,000, and note the (greasy) results.

The Elmore four-cylinder motor furnishes four light, smooth, power impulses per turn of the flywheel in ordinary driving on good roads; strike a heavy grade and open the throttle; four powerful impulses per revolution follow, but are applied so smoothly and quietly that it is very easy on machinery and tires; therefore, minimum repair expense.

Contrast this with the two heavy explosions per revolution in a high-powered four-cycle motor, there being an interval between each two-power impulses. The results tell on the tires, the mechanism of the car, and on the passengers. There is no interval between explosions on any Elmore motor, the power impulses overlapping each other and resulting in a smooth application of power more like an electric motor than the ordinary explosion engine.

In conclusion, if it is a fact, as you state, that the two-cycle motor is wasteful of fuel; that it will not develop over one-fifth more power than the same sized four-cycle engine, and that the "doubling up, or doing two things at once" is a hindrance to its perfect working, then please explain why I can take six full-grown people up a stiff grade in my 24-horsepower car that has been in service twenty-one months, and do this on high gear at a good rate of speed, when it bothers some of the so-called "thirties" to get up with four passengers? Also please explain why, in a distance of over 8,000 miles, my repair expense runs less than one dollar a month and why my total expense is less than ten dollars a month, and why the original set of tires are on the car in running order, three punctures being the extent of the trouble? Last, but not least, why do you suppose I was able to drive this car from November 25, 1907, until December 22, 1908, without ever entering a shop or making a single machinery repair? Would advise that you make a thorough test of a 1910 Elmore and then give the two-cycle motor its just dues, regardless of the fact that it is now greatly in the minority.

W. H. THAYER.

Pueblo, Cal.

A single question will suffice in answer to Mr. Thayer's argument above, and it is suggested by his own last sentence. If all that he says or claims is true, why is it that the two-cycle is "now (as always) greatly in the minority?" In comparing different engines double as many four-cycle cylinders should be used as two-cycle.

FINAL SKIDDING SOLUTION

Editor THE AUTOMOBILE:

[2,009]—I have read your reply to the Letter (1,994) of "I. B. G." I have also gone over your diagram very carefully, and still think that you are wrong. Let us suppose that a car is skidding on a wet pavement. If the driver holds his front wheels straight, that is, in the direction in which the car was going, the rear wheels will skid let us say to the right until the steering angle is reached. By the steering angle I mean the extreme angle which the front wheels will make with the line "A B." Now, when this limit is reached, the still skidding car will then begin to drag the front wheels around and will, of course, have to work against the resistance of these wheels on the roadway. If the front wheels had been turned to the opposite side when the skidding started, the resistance which you have marked with arrows against the front wheels does not operate against the skidding rear wheels but increases the angle made by the line "B D" with a line drawn through the hubs of the front wheels and practically gets the front wheels out of the way. The result is that the limit of the angle which I have called above the "steering angle" cannot be reached, and therefore the car will keep on going around as long as there is momentum enough to carry it. On the other hand, if the front wheels are quickly turned in the same direction as the skidding rear wheels, the steering angle is quickly reached and the momentum has to work against the resistance of the front wheels through a greater distance. For this reason the skidding car will hardly, if ever, turn completely around if the wheels are turned in the same direction as the rear ones, while if turned in the opposite direction, with fair momentum, the car will surely face about. I trust that I have made myself clear in writing about this matter as, in practical use, I have saved myself from the gutters many times here in New Orleans where we have deep ditches on either side of the roadway. When driving through the city streets where the roads have a fairly high crown, and one has to keep to the gutter side, and where the street department's water cart drivers go to sleep and deluge the pavements, making them more than slippery, because they do not wet enough to wash off the dust but only convert it into mud, a driver is very apt to feel his rear wheels slipping toward the ditch. As sure as death and taxes, if he faces his front wheels in the opposite direction to his slipping rear ones, he will need a friend to get him out, whereas a quick turn in the same direction, and then when he feels the resistance of the rear wheels against the front ones, turn them as quickly to the straight line again, will keep him "a-going" along just as if nothing had happened. ALBERT J. MAYER.

New Orleans, La.

While not agreeing with the writer above, nothing will be offered to dispute him, since we do not wish to prolong the already lengthy discussion of this subject.

STOP THAT MISSING

Editor THE AUTOMOBILE:

[2,010]—I drive a six-cylinder car, with which I am having much trouble. As long as the motor runs rapidly, either on the high speed or any other speed, it pulls well, but it both misses and backfires when running slowly. The trouble is no doubt in the carbureter, because when running on either storage batteries or magneto, or both, it does the same thing. The valves are all right as to time, and all cylinders have good compression. Aside from the source of trouble, the carbureter is all right, too, as I have had the float out, dried it, and given it an extra coat of shellac. W. K. RODGERS.

Brilliant, Ohio.

Your trouble lies in the adjustment of the carbureter, rather than in the carbureter itself, and from the description of your trouble it looks as if you were feeding the engine too lean a mixture. This may be done by having too much air or too little gasoline. To adjust the carbureter properly it should be adjusted not for high speed alone, but for slow speed as well. This is done about as follows: Run the engine as slowly as possible, gradually reducing the gasoline until you have brought this down as low as the engine will stand and still continue to run. Then try this out on the road and find out if you have gone too low or not low enough, remembering that the lower you go at this end, the less will be your fuel consumption. Having satisfied yourself as to this slow speed adjustment, take up the high speed, which usually consists of the auxiliary air only, since the motor usually can suck enough gasoline for any speed. Run your engine as fast as possible, meanwhile slowly, very slowly, opening the auxiliary air valve adjustment, as long as the speed continues to increase. Try this several times, until you obtain the widest possible opening, or, rather, that opening which gives the highest possible speed. Then try it on the road, as was the case with the slow speed adjustment. This latter step is always advisable, since, after all, it is for road use that you want it adjusted, and the two vary greatly.

RULE OF THE ROAD

Editor THE AUTOMOBILE:

[2,011]—I have noted in your issue of May 27, 1909, an article headed "Aids in the Driving of a Car, Part 2." In this there is something about passing cars or other vehicles on the wrong side, illustrated by means of a figure, showing a car passing on the inside of a truck.

In your illustration you speak of car A taking the course A, which I suppose is the lower line, passing the truck on the wrong side. Our Michigan law in Section 17, Act 196, 1905, would give us exactly the opposite interpretation, if I understand it correctly.

Am I to understand from your article that the truck, or the first vehicle on the road, has the right of way over the second vehicle or automobile, and that the truck would naturally turn to the right in passing another vehicle and thereby leave little room for the second vehicle, or auto, to pass on the right side, therefore making it necessary, and the natural course for the vehicle No. 2, to receive little consideration and be compelled to pass on the left hand side?

Traverse City, Mich. LEON F. TITUS.

You are right about the law, which requires the second vehicle or automobile in this case to take the left hand or upper course, as indicated by the dotted line. This would make the truck turn in to the curb and give the automobile more room to pass, or if it did not do so, the machine would be obliged to slow down, and drop back behind the truck until the other approaching automobile had passed.

If you will reread the article which goes with this figure, however, you will find that the writer advocates that automobilists neglect to observe the letter of the law, since the average truck driver will do likewise and not turn out from its central position. It is there pointed out that the usual country road is highly crowned or cambered, and that for this reason the truck driver will not turn out, as that would mean much difficulty in getting back.

It is also there pointed out that to take the right or legal course presents more danger than the one advocated, since the truck driver will not turn away from his central position, and the automobilist passing at speed, will find himself running head on into the other approaching machine, with much danger to both.

FLYWHEEL WEIGHTS

Editor THE AUTOMOBILE:

[2,012]—Will you please give me a formula for proportioning the size and weight of flywheels on large stationary gas engines, one that could be used for any type or size of engine. HARRY DAY.

Buffalo, N. Y.

The very idea of a flywheel, to steady the running of the engine by storing up energy during the power stroke and giving it out again during the idle strokes, shows that the weight is the necessary item, the size usually being a matter of conveniently arranging that weight.

Mathot is responsible for the following formula:

$$P = K \frac{N}{D^2 a n^3}$$

from which the total weight equals 1.4 P. In this formula, P = the weight of the rim alone, without arms, spokes or bosses.

D = the diameter of the center of gravity of the rim in meters.

a = the coefficient of irregularity.

n = revolutions per minute.

N = brake horsepower at that speed.

K = a varying coefficient, this varying with the type of engine, cycle, and number of cylinders, as follows:

44,000 for four-cycle, single-cylinder, single-acting.

28,000 for four-cycle, two opposed cylinders, single-acting, or one cylinder, double-acting.

25,000 for two single-acting cylinders, with cranks at 90 degrees.

7,000 for four twin opposed or two tandem double-acting cylinders.

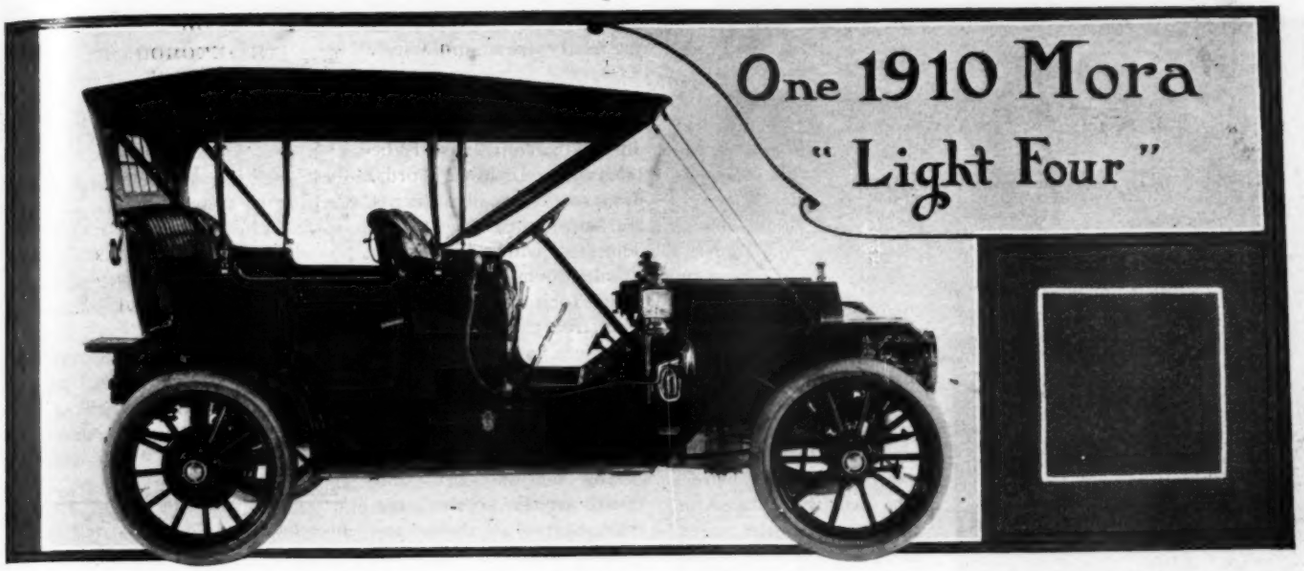
In use, the service determines the coefficient a, as, for instance, electric lighting service would require a very low coefficient of irregularity, such as 2 per cent., or .02. Then n and N would be assumed, the assumption of the type and cycle fixes the varying coefficient K, from all of which P and D would be found by the method of trial and error. That is, a diameter is assumed and the figures carried through. If the result is not correct nor satisfactory, make another assumption, either higher or lower, as the former result was too low or too high, and carry through another series of figures.

The only arbitrary part of this is the coefficient, which was determined by careful experiment from a number of Continental engines, most of them from Germany and Belgium. The coefficients as given are very reliable.

None of the above applies to automobile construction, and students of the latter, interested in the subject of flywheels but not having the time to work these out from a correct mechanical standpoint, may use the following for which Güldner, the German scientist, is responsible:

$$R_e = C\,(.75 + \delta)$$

Lucke on page 242 of his work on Gas Engine Design, gives a table of values of the two constants.



Appearance of Mora Light Four Touring Car, Upon Which Factory and Other Facilities Will Be Concentrated

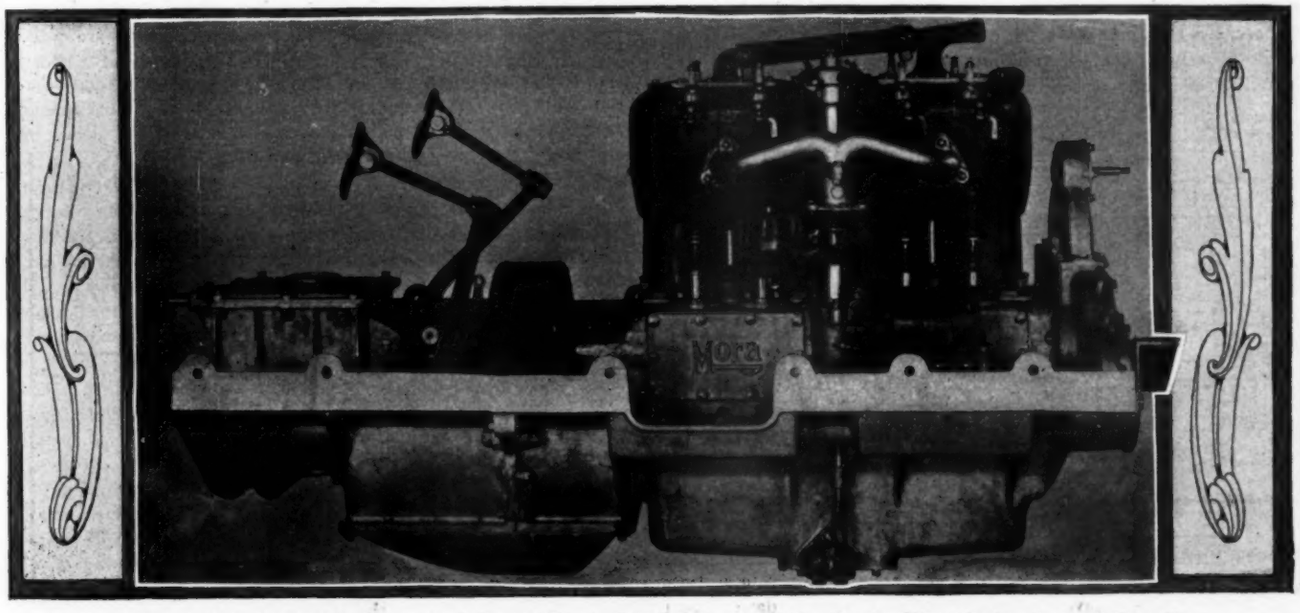
AT a time when everybody is talking of "sixes" and long stroke motors, the plans of the engineers for the Mora Motor Car Company, Newark, N. Y., relative to the season of 1910 may prove to be epochal in their character, since this company will abandon the "six," devoting its whole energy to a single type of four-cylinder chassis in which the length of the stroke of the motor relative to the size of the bore has been reduced. Moreover, added zest is lent to this announcement, by the statement that the price of the four, which is continued for 1910, will be slightly increased.

Some small but consequential changes have been made, including a longer wheelbase, larger wheels and tires, a new carbureter, gear pump for the oiling system, change in the water pump from gear to centrifugal, "tee" instead of "ell" head motor, placing the valves on opposite sides instead of all on the left side as before, gear drive for the fan, and many other little refinements.

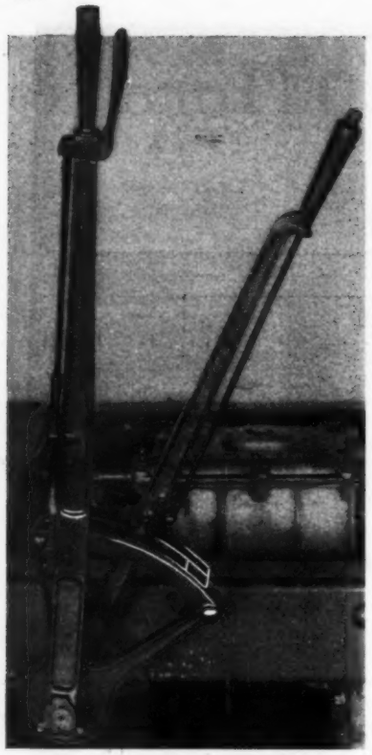
This model, which the Mora people do not call by a model number, although it is the fifth which the company has produced, will continue to be known as the Light Four. Of this title, the first word is descriptive of the light weight construction, which this concern advocates, and the second, of the number of cylinders of the engine. In the continuation of this model, five important points, which might even be called policies, have been kept constantly in the foreground. These are: first to refine continually a car of a given type, and thus obtain the advantage of previous use on the part of many users; second, to build every piece in the factory, so as to be able to supervise its construction; third, to build a car of intermediate weight so as to keep down tire and maintenance costs; fourth, to design and build for reliability at all times; fifth, to design and build as simply as possible, omitting all unnecessary parts.

Adherence to these points has resulted in the production of the Light Four. This is powered with a four-cylinder engine of 4 1-2-inch bore by 5 1-8-inch stroke, as compared with the previous motor, which was of 4-inch bore and the same, 5 1-8-inch stroke. Just as the old engine was conservatively rated at 25 horsepower, so the later one is also given a modest power rating of 38. The change in the bore alters the relation of bore to stroke, which in the light of the present foreign tendency is perhaps worthy of further mention.

The former bore and stroke gave a ratio of 1 to 1.28, one of the longest ratios to be found on an American car. The present



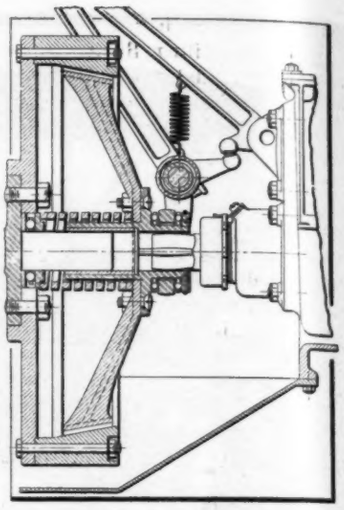
Clean-Looking Inlet Side of the Unit Power Plant, Showing New Cylinder Construction, Carbureter and Magneto



Mora Control Levers and Quadrant

sizes make this read 1 to 1.14. This latter figure, strange to relate, agrees exactly with the average of 78 different engines exhibited at the two New York automobile shows of last winter. Most noticeable among the many changes in the engine is the alteration in the cylinders, which are now cast in pairs with the valves on opposite sides. This construction makes the cylinder castings symmetrical, and, therefore, balanced in weight better. The exhaust is placed on the left, with the water pump, while the right side carries the inlet, carbureter, and magneto. This distribution of the accessories sizes the gears so that the gear cover, of aluminum, at the front of the engine case, becomes symmetrical about the center line. The upper part of this is now carried up to take in the new gear drive for the fan, this being effected through spur gears, which replace the former leather belt drive. The cover is so designed that it is possible to remove the fan drive for adjustment or other purposes, without disturbing anything else. The valves, which are of two metals, nickel steel heads welded to carbon steel stems, are of large diameter and liberally water-jacketed. Unusual care has been taken with the camshaft so as to preclude the possibility of accident. Thus, the case hardened cams are both keyed and pinned to the shaft. Should the pins fail, the keys will still hold them in place, and are made of sufficient size to do the work.

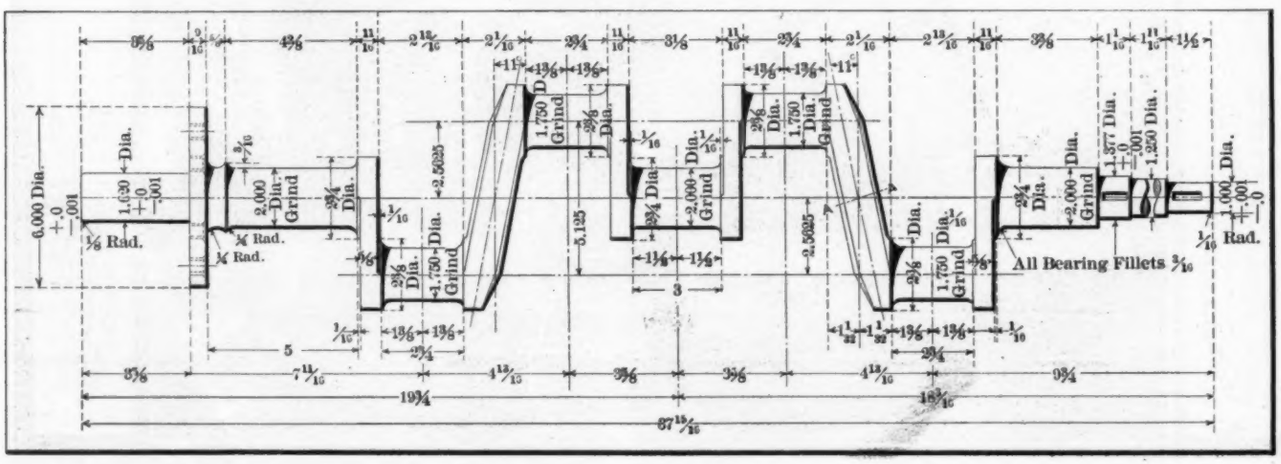
Combination Crankcase and Mud Pan—One of the principal features is the cast aluminum crankcase and mud pan combined. While this is an expensive construction, the builders consider it as superior to such an extent that it is made the feature of the car. This pan gives the power plant great rigidity, being bolted securely to the transmission case, and thereby eliminates the universal joint between engine, or rather, clutch, and transmission. This pan really makes the frame more stiff, while the close connection with the frame makes the crankcase a more rigid form than it would be otherwise. In other words, each one mutually stiffens and strengthens the other. This, too, with a liberal use of aluminum, which is famous for its light weight. This free use of aluminum is noticeable throughout the chassis, despite the high market price of the light-weight white metal.



Inverted Cone Clutch Is Self-Contained as to Thrust

Coincident with the increase in the size and power of the motor, the crankshaft has been increased both in diameter and length of bearings, as shown by the appended reproduction of the working drawing. The shaft is heavier and the bearings longer than general practice would make them, which is an excellent point in their favor. The makers say that a few extra pounds weight here is metal well placed, and have as proof that they are right the records to prove that no Mora owner has ever had a crankshaft break. The bearings are of parson's white bronze, a very superior bearing metal, which has a high heat resisting quality, combined with great hardness, yet will melt and save the crankpins from damage before it will seize. This feature is worthy of consideration, since the bearings are made interchangeable and it is but a moment's job to replace one or more of them, and the expense is also small. To buy and replace a crankshaft, on the other hand, is a very complicated, tedious, and expensive piece of work, and one that a novice would tackle with fear and trembling. So it is better to have a bearing that will melt in the absence of lubricant.

A leather-faced, inverted cone-clutch acts as the transmitter of the engine power, and is placed within the flywheel. The clutch spider is of aluminum and strongly ribbed. This is bolted to a steel sleeve, the inner end of which is bushed for the end of the crankshaft. The construction of the interior of the clutch is such as to leave it free from thrust when engaged. The square section clutch spring presses against a large ball thrust bearing. The clutch operating fork is in addition placed between a pair of ball thrusts. This fork is operated from the foot pedal, this having adjustable foot pads, by means of a short, hardened end, pivoted on a crossshaft. The flywheel clutch sur-

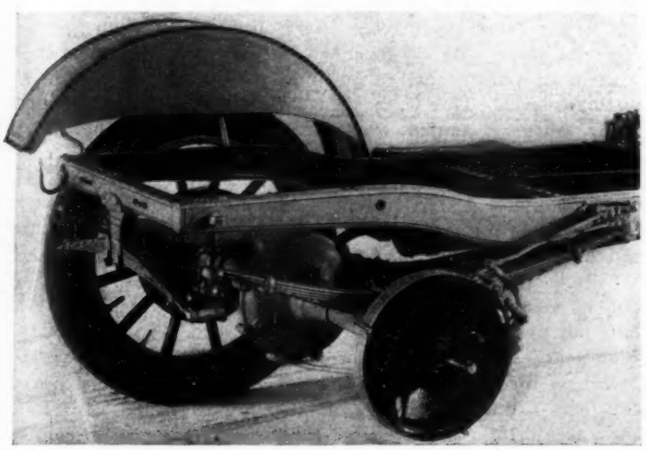


Crankshaft Drawing with Complete Dimensions Will Be of Much Interest to Other Designers as a Worthy Example

face is bolted up to the forward disc by six bolts, the nuts being set into a series of counterbores, so that they are inside and do not project to catch in the clothing when making an adjustment.

Excellent Oiling System for Engine—Improvement being the order of the day, the engine oiling system has been improved. As it is at present, the oil is circulated by a small gear driven pump, located on the outside of the crankcase, inlet side, and on the lower part so as to be accessible at all times. This is supplied with oil from a false bottom in the crankcase, and cast integral with the lower part of it. From the reservoir, the oil is pumped to another smaller header attached to the inside of the hood. Thence it flows by gravity to the crankshaft bearings and cylinders through copper pipes, a sight feed indicating the amount of the flow and its regularity. The overflow from bearings and cylinders drops to the bottom of the case, where it is maintained at a constant level, and used as the source of oil for an interior splash system. The surplus oil, over and above that needed for the splash system, drains back into the crankcase reservoir, and is thus used over and over again.

Successful Transmission of Last Year Continued—Like the clutch, the transmission is unchanged, that of last year, which was unusually successful, being continued. This affords three speeds and reverse, operated selectively. All shafts are mounted

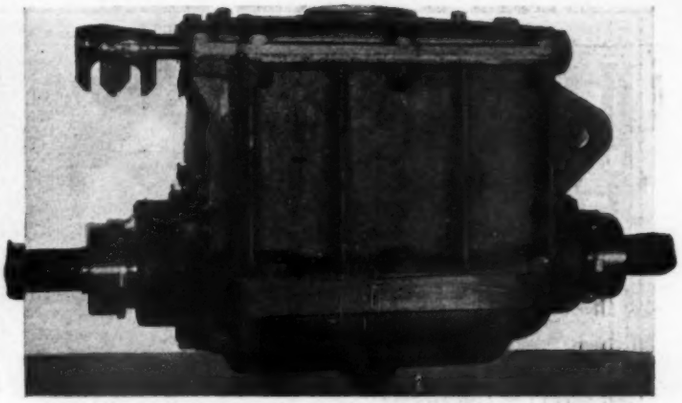


Rear Spring Suspension and Brakes Show Ability

upon ball bearings. Large diameter shafts, large faced gears of large pitch, and other items making for an unusual factor of safety in the gear box just as in the engine, characterizes this speed reducing means, which already possesses the proud record of over 400 in steady use for a year, without a repair or replacement. As built, it is a complete and self-contained unit, which at the first sign of trouble may be removed bodily and another substituted for it, or at least, the trouble remedied outside of the car, with plenty of elbow room. Back of the transmission is placed the universal joint, this being of the company's own make and different. It is also famous for its simplicity, being but a squared shaft working in a squared hole.

What the Axles Show—Flexible roller bearings of the Hyatt type carry the semi-floating bevel driven rear axle. The gears of the bevel drive are cut with unusual care, being of the now popular stub tooth form, which possesses more than ordinary strength. Front axles depend upon ball bearings to carry their load without friction. These are of very large diameters, 1 3-4 and 1 inch sizes being used. This axle is an I-beam section, drop forged in one piece with integral spring seats. As designed for a car of several hundreds of pounds more weight than the Mora, the same large factor of safety is always present.

To facilitate starting, the crank has been brought forward away from the radiator. It is now securely braced from each side. This radiator is just as it was last year, of the popular vertical tube type, of unchanged design.



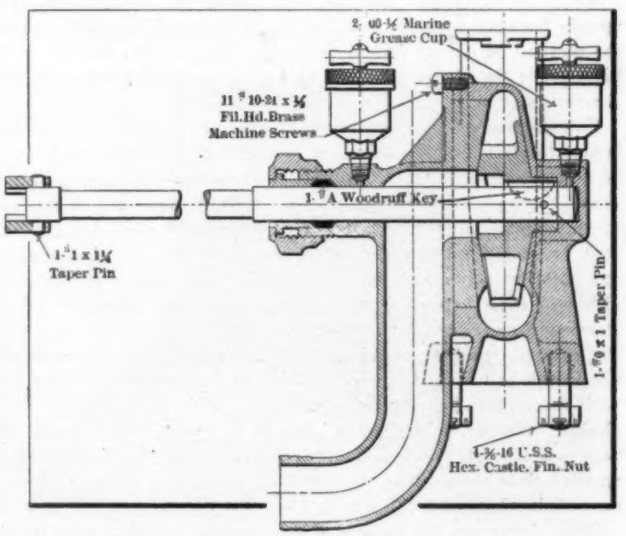
Complete Transmission Unit Removed from the Car

After some years of hard use, no flaws have developed in the spring suspension. The front springs are flat, semi-elliptic, and the rears, three-quarter, or as they are more commonly called, platform springs. The front springs are purposely made rather stiff, the good riding qualities being obtained from the rear spring suspension. To aid in this the body is placed rather far forward, and the space back of it allows plenty of room for a trunk rack, large enough to accommodate a real trunk.

The wheelbase has been increased to 112 inches, the additional 2 inches over last year affording more comfortable riding, also more leg room in the tonneau. Working toward the same end are the larger wheels and tires, the former now having a size of 34 inches, while the tires are 4 inch all around. The wheels are of the artillery type, with 10 spokes in front and 12 in the rear wheels.

Two complete sets of brakes are used, one internal and the other external. These operate on the rear wheel brake drums, which have been increased in size, so that they now measure 14 inch by 2 inch. Not only are they unusually efficient, but their ease and equality of operation is facilitated by the use of a compensating brake bar. This contributes equal pull on all brakes regardless of the amount of power applied or the adjustment, and insures against skidding, through having one wheel held more than another.

The bodies are another example of the great care used in the construction of these cars. They are built with sheet metal panels, the mouldings of which are rolled in the metal and not riveted on. This results in a dependable body, which can be relied upon not to crack open at the seams under the first hard usage.


2-40-¼ Marine Grease Cup
11-10-24 x ¾ Fil. Hd. Brass Machine Screws
1-¾ A Woodruff Key
1-¼ x 1¼ Taper Pin
1-⅝ x 1 Taper Pin
1-⅜-16 U.S.S. Hex. Castle. Fin. Nut

Cross-Section Through Centrifugal Type of Water Pump

The Leader of the Holsman Line, a Serviceable Runabout for Rough Roads

DESERVEDLY popular in the West because of its ability on rough, sandy or hilly roads, the Holsman high-wheeler is now entering upon its ninth successful year. During this period it has undergone fewer important changes of design than perhaps any other car which has been before the public for an equal length of time. The Holsman Automobile Company, of Chicago, the maker, has always remained true to the principle of high wheels—for, as it says, "high wheels travel all roads, because all roads are made to be traveled by high wheels." The wisdom of this epigram has been demonstrated by the steadily increasing average size of automobile wheels, even when shod with pneumatic tires, which seems to indicate that other manufacturers are slowly coming around to the same point of view. The Holsman, however, does not rely on this single feature to distinguish it from the conventional type; its gear-changing, if such it can be called, its method of securing differential action of the driving wheels, and by no means the least, its four-cylinder design of motor, are any one of them sufficient to challenge the attention.

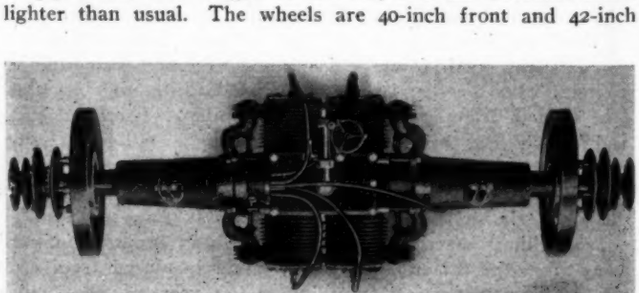
Belt, Chain and Friction Drives Combined—The Holsman method of driving the rear wheels will certainly be distasteful to the man who likes to classify every detail in its proper pigeon-hole. The Holsman drive refuses to be classified, at least according to any ordinary standards. It is a combination of belts, chains and friction rollers, each performing a definite purpose. The ingenuity of the construction will be perceived when it is explained that the gear-changing, which gives two speeds forward and one reverse, is all obtained through varying the method of drive. When the belts are in action, the car is on high gear; the chains give the low gear, and the friction rollers the reverse.

Complicated as this may seem at first glance, the construction is startlingly simple. In fact, at a casual glance there appears to be no change-speed mechanism at all. One sees the motor, placed under the body of the vehicle with its shaft extending from side to side, small pulleys on the ends of the shaft, and belts which pass around larger pulleys on the rear wheels. It takes a close examination to reveal the trick. The belts are really chains, although their action on the high gear is that of belts. When starting the car, or on an unusually steep hill, the two flanges of the grooved pulley spread apart, revealing a sprocket between them; the belt, now become a chain, drops in, its rollers engage with the teeth of the sprocket, and the car is chain-driven. The chains, however, still remain belts as far as the pulleys on the rear wheels are concerned. As the sprockets are considerably smaller than the pulleys they replace, this drive gives a greater gear reduction, and the car is then on low speed. It will be evident, however, that unless some special provision were made the chains would be very loose on the low gear, and would be apt to jump occasionally. The necessary provision is again obtained in the simplest, though most unexpected way; the whole motor, with its shaft, pulleys and sprockets, is hung from the frame by two knuckle joints, on which it may be swung backward and forward. A forward movement of the motor, therefore, obtained at the same time and by the same action of the controlling lever which spreads the pulleys apart to disclose the sprockets, tightens up the chains and forces them into firm engagement with the sprocket teeth.

This flexibly-supported and moveable motor once conceived, its second application became immediately apparent. The ends of the motor shaft were extended beyond the pulley-sprockets, and a second set of grooved pulleys applied. Swinging the motor backward then brings these pulleys into direct contact with the solid rubber tires on the rear wheels, and provides the reverse. The same action loosens the chain-belts so that they no longer exert any driving effort forward, although they remain in place. By an ingenious system of connections, these various movements are obtained by progressive movements of a single lever. This lever swings horizontally on the top of a shaft which is united with the steering column, making it extremely convenient to operate.

Two Speeds and Reverse without Gears—To summarise, then: the motor is started and runs idly hanging in its middle position, neither forward or back, and with the pulley-sockets spread apart. To start the car forward on the low gear, the motor is swung forward; this tightens the belt chains so that their rollers engage with the sprockets, giving a positive drive which will not slip no matter how great the load. To go into the high gear, the motor is swung back to its first, central, position, loosening the chains; then the halves of the pulleys are forced together, lifting the chains off the sprockets and converting them into belts. To obtain the reverse, the motor is brought to central position, the pulleys are spread apart to loosen the belts, and then the motor is swung backward till the small pulleys on the extreme ends of the motor shaft engage with the tires of the rear wheels. This drive of course rotates the wheels in the reverse direction to that obtained by the chain or belts.

The driving chains are specially constructed of hardened chrome-nickel steel. They run in deep sheaves, so that they can not be thrown out of engagement. On high gear the chains are as noiseless as an ordinary belt, and on the low gear make no more noise than the usual drive chain. The chains leave the rear sheaves at a point 15 inches above the ground, so that there is no danger of their becoming entangled with stones or brush. One of the particular advantages of this construction is that the power is applied as near as possible to the rims of the wheels; the spokes and hubs therefore do not transmit any power, but simply sustain the weight of the car, and can be made much lighter than usual. The wheels are 40-inch front and 42-inch



Unit Power Plant—the Motor and Change-Gear

rear, and are shod with 11-4 inch solid rubber tires. Sweet patent wheels, with concealed metal band hubs and offset spokes, are used on the runabout, surrey and coupe, and Sarven patent wheels on the $550 light runabout and on the delivery wagons. All hubs are roller bearing except those of the light runabout.

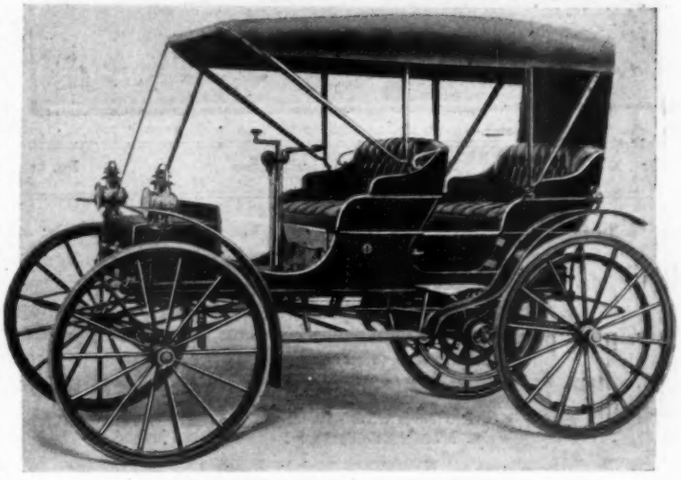
How the Differential Is Abolished—So far, the reader will observe, no provision has been made for the introduction of a differential gear. The driving pulleys and sprockets are mounted directly on the ends of the solid, one-piece motor shaft. However, the same mechanism that is used to obtain the gear-changes provides a very acceptable substitute for a differential; in fact, the Holsman Company claims that in this case the substitute is better than the original. The trick lies in the movable suspension of the motor, which is interconnected with the steering gear in such a way that when the vehicle rounds a curve the inner end of the motor is swung back a little, loosening the belt on that side so that it can slip, while the belt on the other side is slightly tightened. The advantages claimed for this construction are not only its simplicity, but also a mechanical superiority, in that the amount of power applied to the wheels, as well as their speed, is varied. The ordinary differential gear, while allowing one wheel to run faster than the other, still gives the same power to each. On the Holsman, however, the inner wheel not only runs slower, but as its belt is slipping it receives less power, and the outer wheel, which is doing more work, receives proportionately more power. For this reason, it is said, the Holsman is little given to skidding.

Although the Holsman Company has experimented with wheel steering, it still retains the lever for use on its vehicles as being more reliable and easily operated. The lever connections do not wear or develop the lost motion which frequently becomes so noticeable in wheel-steering gears. There is no necessity for irreversibility or for great leverage; the nearness of the steering knuckles to the hubs, the narrowness of the tires, and the lightness of the front construction—hardly more than the weight of the front wheels themselves—are all conducive to easy steering. The steering post is placed in the middle, about eight inches forward of the seat, and carries also the other control levers. All are so arranged that they can be operated equally well from either the right or left side. In carrying out this same idea, the motor is so arranged that the starting crank can be applied to either side.

Four-Cylinder Motor Light and Compact—The four-cylinder motor, which is interchangeable with the two-cylinder motor on all the models except the light runabout, is, in its way, as radical a change from ordinary constructions as the change-gear. The cylinders are horizontal and are opposed in pairs. All piston pins and connecting rods have been abolished. The pistons of each opposite pair are rigidly connected by a steel frame straddling the crankshaft, following the design technically known as the "Scotch yoke." The yoke carries in its middle a large roller bearing, of which the inner radius is equal to the radius of the crank plus the radius of the crankpin. As the yoke, with its pistons one on each end, oscillates backward and forward, it rolls the crankpin around the inner surface of this bearing and so rotates the crankshaft. This design naturally limits the pistons to a very short stroke, but has compensating advantages in the way of eliminating numerous parts and bearings. Counting the three crankshaft ball-bearings, it will be seen that the entire motor has but five bearings, instead of the eleven which would ordinarily be used for the same work. The bearings are exceptionally large in proportion to the service which they perform.

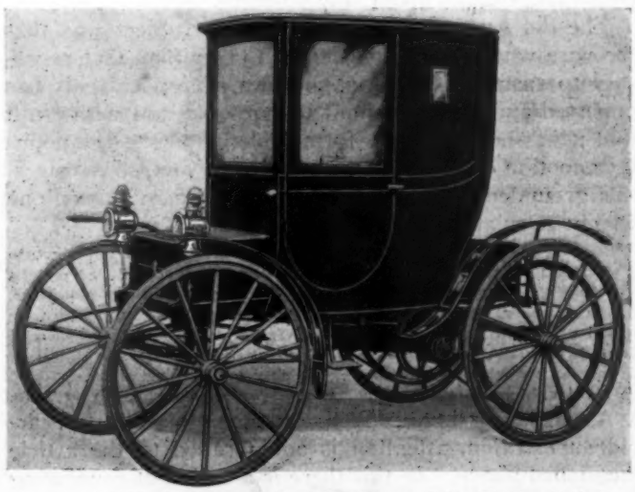
The "unit power plant" idea is carried to its highest development in the Holsman. The motor crankshaft is extended at each end to carry the driving sprockets and pulleys. The crankcase is also extended in the shape of sleeves, carrying the lugs by which the motor is suspended from the frame, and supporting the shafts in large roller bearings. There are two flywheels, placed one at each end just inside of the pulleys.

Other features of the motor are so plentiful that they can hardly be more than enumerated. The cylinders are air-cooled by flanges cast integral, and no fans are found necessary. The inlet valves are automatic and are located in the pistons; the mixture reaches them through the crankcase, much as in a two-cycle motor. The carbureter, a Holsman design with but one adjustment, bolts directly on to the top of the crankcase. The exhaust valves are actuated directly from the crankshaft, and the crankcase extensions carrying the outboard bearings of the shaft are used as mufflers. Lubricating oil is carried through the motor and into the cylinders with the gasoline mixture. No adjustments are necessary. Ignition is by batteries, with a single coil and high-tension distributor.



Holsman Surrey, a Car for the Whole Family

Holsmans Made in Many Types—Eight different styles of bodies may be had—three runabouts, a surrey, a coupe, and three delivery wagons. Three different chassis are built, with wheel bases of 65, 80 and 92 inches, respectively; on all of these except the smallest, the four-cylinder motor described above, which is rated at 26 horsepower, is interchangeable with a two-cylinder, 12-horsepower motor. This latter is of more orthodox design; its cylinders, 4 by 4 inches, are horizontal, opposed, and air cooled, but it has the usual connecting rods with plain bearings; its inlet valves are automatic and directly over the exhaust valves. It is adapted to the same unit construction as the four-cylinder motor. The $550 light runabout, with 65-inch wheel base and the 12-horsepower motor, is practically the same car that the Holsman Company has been building for five years, and a great number of them are in active service. All Holsman types can be had with a 61-inch tread.



Holsman Coupe, Especially Favored by Doctors

THE AUTOMOBILE

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WIRE WHEELS SHOW PROGRESS

Modern automobilists, who are deeply interested in the subject of weight, and its immediate effect upon such items as tire mileage, repairs and per-mile-cost, will doubtless peruse the timely article elsewhere in this issue on the subject of wire wheels with more than ordinary attention. Many experienced motorists favor lightweight construction, but when this is applied to the subject of wheels, they sidestep, with vague and noncommital remarks about side strength.

The old superstition relative to this subject was that the wire wheel had much strength other than that necessary to sustain sidewise application of force. This has persisted and persisted until it might be said with truth that it has been the only formidable barrier to the popular adoption of this type of wheel. In fact, so deeply is this grounded that it is to be found in many books, one widely circulated work commenting as follows:

"Now while it is widely conceded that a wire wheel will sustain a greater load than a wood wheel, the two being considered weight for weight, it certainly will not sustain as great a strain sideways, which represents the line of the wheel's greatest weakness. A wire wheel driven against a curb with sufficient force will have its rim dented, with the result of loosening all of its spokes and ruining it. A wooden wheel, on the other hand, may have a gap in it and still be serviceable. It may even run with several spokes broken off," etc.

As dispelling in an effective manner this twenty-year-old superstition, attention is again called to the article mentioned above. In this there is a brief but convincing description of tests made on such wheels in England, in the course of which tests, wood wheels of the usual artillery pattern were tested under parallel conditions. The results show plainly why these wheels are so extensively used in England, since the old idea of lack of side strength is not only dispelled but unbiased tests prove that the opposite of this is actually the case, the wire wheel possessing a superior strength to its artillery competitor.

Second to nothing else in showing this is the accompanying series of tests, in which, having already put one of the artillery wheels out of business, the wire wheels surpassed the remaining wooden competitor by a tremendous margin. This test was in the nature of a reverse stress. Now, it is well known in engineering that the most severe stresses, and those which are most destructive, are alternations of stresses: applications of force from two opposite directions. Yet, it was under that very kind that the wire wheels stood up best. So it may fairly be said that a slight revision of our ideas relative to wheels is very much in order.

Viewed from a purely utilitarian standpoint, it means that the devotees of long touring can carry a complete spare wheel with tire, at the same total weight for the five wheels and tires, in case wire wheels are used, as the ordinary motorist with but four wheels and tires (those on the four wheels) of the wooden artillery type. That is to say, the weight of one whole wheel and tire is saved by the use of wire-spoked wheels.

ELECTRIC AUTOMOBILE LIGHTS

Ever since automobiles were invented their owners have been accustomed to struggle with refractory lamps. They have had tail lamps that would not stay lit; side lamps that smoked; headlights with clogging burners and cracking or tarnishing reflectors; generators which would not generate, and gas-tanks which refused to surrender any part of their precious contents. These annoyances are decidedly less frequent now than a few years ago; but the automobilist, accustomed to bestowing considerable care on his lighting equipment, still patiently stops his car at nightfall, dismounts, and trudges from lamp to lamp, kindling each one with a match carefully sheltered from wandering breezes. When he reaches home, on the contrary, he snaps a convenient switch, and instantly the room is flooded with light. Strange that the most modern means of travel should hold to so antiquated a system of illumination!

Electricity was formerly in ill repute for automobile lighting, as the incandescent bulbs of some years ago consumed an excessive amount of current, and at the same time were very susceptible to vibration. The carbon filaments were provokingly brittle, and with the filament once broken the lamp was worthless. Both these old objections have been nullified by the introduction of the tungsten lamp, which is at once economical of current and, in its improved forms, exceedingly robust. The smaller consumption of these lamps makes it practical, in some cases, to use ignition storage batteries as a source of current; a storage battery specially designed for lighting purposes will give perfect service, with very low cost. In addition, there are a number of mechanical generators which can be used both for ignition and lighting; the first cost of these is but little more than the battery, and they consume but an inappreciable amount of the power.

INDIANAPOLIS SPEEDWAY WILL HAVE A NEW SURFACE

INDIANAPOLIS, Sept. 6—Either the finest road brick or a bitulithic cement will soon be placed on the Motor Speedway and will give it the greatest track for automobiles in the world. This has been decided upon by the management, and for the last few days experts have been submitting figures and samples of materials that would be best for the complete roadway. A sum of $150,000 has been set aside for the purpose of resurfacing the course, and it is probable that still more will be necessary before the work is completed. It has been found that a bitulithic surface, would cost $100,000 and make the track smooth and hard enough to permit a speed of two miles a minute with safety. A layer of the very finest road brick, at the rate of $15 per thousand, would perhaps make the track even faster and certainly as durable, but the cost would be proportionally increased. The requirements would take 4,000,000 brick, costing $150,000, with $20,000 for laying them, meaning that the expense would be nearer $200,000 than $150,000. Money, however, is a minor consideration and whatever promises to give the greatest satisfaction will be adopted.

The officials of the speedway are determined to make the circuit all that was expected of it in the fondest hopes, and the entire equipment is being considered thoroughly to see where it can be improved. Experimental surfaces of brick and cement will perhaps be tried, but it is the opinion that the former will be the one selected. The cost of the entire affair to date is $425,000, and the added appropriations will raise this to nearly $650,000. In addition to the new surface for the racing machines there will be marked improvements around the grandstands. New restaurants will be installed in both the 50-cent and dollar parking fields, in addition to the two already there, and four refreshment stands will be built. Two tunnels will go under the track so that automobiles can be driven to the infield during the running of the events, or leave before they are entirely finished, at the will of the owners. There is room for 20,000 machines in these big parking spaces, and accommodation for others outside.

For the information of those watching the races the Warner automatic timer will be improved and enlarged so that in addition to scoring the number of the first three cars, the laps, and the time total, it will give the number of the events, the number of each race, and the complete score of every contestant. Assistant announcers will be stationed at vantage points and will receive their instructions direct from the chief announcer at the main post. The military board is training the soldiers so that the course will be policed better than ever at succeeding meets. The spectators will be assured of ample protection.

According to present plans it is the intention to hold the next automobile contests after the big aeroplane carnival, which will come during the middle of October. In this way the public will be given a chance to inspect the track with its new surface and will be positively assured that the accidents of the opening days will not be repeated. That series of events taught many lessons which are being carried out now. The management is in close touch with the needs of the big motordrome and the suggestions of those who witnessed the speed carnival last month have been given close attention. It had been announced that the next race meet would be held about the middle of October, but this has been postponed until later in that month, or until early in November. This will give the new surface ample time to set and make it safer. Then, too, there were conflicting dates which required rearrangement. A 24-hour race will be the feature of the next series.

Entry blanks have already been sent out for the proposed aviation contests, which are scheduled for October 15, 16, and 17. Aeroplanes, dirigibles, and balloons are included separately, but the conditions for them have not been announced. Cash prizes amounting to $10,000 will be offered. In a cablegram received from Glenn Curtiss he finally agrees to the terms offered him to be present with his biplane, and to attempt to better his record-breaking achievement at Rheims. He also gives the interesting information that a pupil of Louis Bleriot, with a Bleriot monoplane, will accompany him to the United States. It is expected that Curtiss and the Wright brothers will represent this country. Two dirigibles are being constructed here for the contests in their classes, one to be piloted by Carl G. Fisher and the other by G. L. Brumbaugh. Thomas Baldwin has assured the management that he will enter.

MUNSEY TOUR WILL TEST 1910 RULES

WASHINGTON, D. C., Sept. 6—Considerable interest attaches to the fact that the Frank A. Munsey reliability contest, from Washington to Boston and return, September 21-29, will be run under the 1910 rules recently adopted by the American Automobile Association. They will have their first tryout in this contest. Under these rules a fixed penalization schedule will be used, a fact that has been strongely commended by all the factories that have entered cars in the Munsey tour. Another departure from the old order of things is the changing of the cars from classes to divisions, ranging from division 1, for cars costing $850 and under, to division 6, for cars listing at $4,001 and over. Division 1 cars will be started first, followed in rotation by the other divisions. Cars in divisions 4, 5, and 6 will average 20 miles an hour; those in divisions 2 and 3, 18 miles, and those in division 1, 16 miles. The new rules are very comprehensive and embrace 162 different paragraphs.

Handsome trophies will be awarded the winning car in each division, in addition to which there will be a grand sweepstakes prize to be awarded the car making the best mechanical and road score. In addition to these awards, the entrance money will be divided among the drivers of the winning cars in each division. Thirty-one cars, embracing 26 different makes, have been entered to date. The latest entries include a Renault, entered by L. H. Shaab, Baltimore representative of Renault Freres, and a Hupmobile, entered by the Hupp Motor Car Company, of Detroit.

MILWAUKEE PREPARES FOR ITS "24"

MILWAUKEE, WIS., Sept. 6—Under the auspices of the Milwaukee Automobile Club the third annual 24-hour race will be held this year on September 24 and 25, on the State fair grounds track. As usual it will be the leading event of a two-days' speed carnival, and the shorter contests will range from the one mile to that of 100. The programme is still being made up. The entire meet will be conducted with an A. A. A. sanction.

Extraordinary preparations are being made for the races, especially for the round-the-clock grind, and from September 23 to 26 the fair grounds will be under martial law, with the State troops in full charge. The mile course is one of the best in the West, and it will be made still better in the coming weeks, for immediately after the 1909 fair, lasting until September 17, the club will have men upon it to put it in splendid shape. The turns will be reconstructed, oiled, and rolled to a stone-like surface. An original unit lighting system will be installed, consisting of 200 lights of 300 candlepower each, 20 feet apart. Lee A. Dearholt is chairman of the club's racing board and will again have charge of the events. President Clarke S. Drake will again be the referee.

An innovation in track racing will be seen in the arrangement of the repair pits directly before the grand stand, as in road contests. The enclosure of former years will be used as a parking space, and other quarters will be given in which the reserve crews may rest and have their meals.

TWO ENDURANCE RUNS IN NORTHWEST

MINNEAPOLIS, MINN., Sept. 4—This city has been the center of two endurance contests within a few days, the first being that under the auspices of the Minneapolis Tribune, to Duluth and return, and the second being the "Little Glidden Tour" of the Minnesota State Automobile Association. The former was held on Tuesday and Wednesday of last week, and the latter between Friday of last week and Tuesday evening.

Jean Bemb, in the Chalmers-Detroit, with which he won the Detroit trophy in the Glidden tour, was the victor in the Tribune run to Duluth and return, with the Franklin, driven by Carris, second; another Chalmers-Detroit, third; Walter C. Winchester, in his Pierce-Arrow Glidden winner, fourth; and a Ford was fifth. The run was a combination of the regular endurance contest with note taken of gasoline and oil consumption, and technical examinations. The big Pierce had the best record in the gasoline efficiency contest, showing 26.43 ton-miles to the gallon, while its nearest competitor had a mark of 20.73 ton-miles. The scores at the finish were: Chalmers-Detroit, 957; Franklin, 936; Chalmers-Detroit, 932; Pierce-Arrow, 926; Ford, 839; Pullman, 816; Gaeth, 813; Ford, 760; Lozier, 641. The Franklin had the only perfect road score.

The annual tour of the association started with 16 cars in line. The first day was a run to Alexandria, the second to Fargo, N. D., where Sunday was spent, and the stop on Monday night was at Benson, reaching this city on Tuesday evening. At the finish there were but seven cars with perfect road scores, and two of these were penalized in the technical examination. The five perfects were: Packard, driven by H. J. Clark; Pierce-Arrow, Reuben Warner, president of the St. Paul Automobile Club; Chalmers-Detroit, Barclay Automobile Company; Chalmers-Detroit, H. S. Johnson; and Brush runabout, Will Kemp. The two others with clean road slates were: Apperson, Basselle Automobile Company, and Ford, George Doerr. The performance of the little Brush was considered phenomenal. The penalties inflicted were as follows: Lexington, Haynes Automobile Company, 6.3; Oldsmobile, H. S. Johnson, 6.5; Cadillac, R. Stanvard, 7; Ford, A. Hanson, 10; Franklin, Theodore Wetmore, 10; Hupmobile, 40; Apperson, Ford; Haynes, Burney Bird, withdrawn, 1,000; Glide, Col. F. M. Joyce, withdrawn, 1,000; Glide, F. E. Murphy, not reported.

FIVE-DAY TOUR FOR HOUSTON AUTOISTS

HOUSTON, TEX., Sept. 4—In the interests of the automobile dealers and owners in this city, the Houston Post is preparing a five-day endurance contest. The trade has liberally supported it and from present indications the event will have at least 30 entries, many of which will be the 1910 models. The start has been scheduled for September 24 and advices from along the route promise a hearty reception everywhere. As laid out now, the following is the itinerary: Houston to Victoria, 125 miles; Victoria to San Antonio, 130 miles; San Antonio to Austin, 80 miles; Austin to Brenham, 80 miles; Brenham to Houston, 86 miles; total 501 miles. The contest will be held under the rules and sanction of the A. A. A., such as those used in the last and most interesting Glidden Tour.

The Post has offered the main trophy, and it is likely that others will also be added by other parties, in order to make the affair more interesting. It is felt here that while the daily runs are not long, and the roads are generally fair and good, there will be plenty of ways in which the contesting machines will be well tried. The event is in the hands of a committee of which O. J. Lorehn is chairman.

COLUMBUS, O., PLANS 24-HOUR RACE

COLUMBUS, O., Sept. 6—It is probable that a 24-hour race will be the feature of the October meet under the auspices of the Columbus Automobile Club. The event will be held upon the local one-mile track, and the details are now being arranged.

DENVER OUTLINES WORK FOR 1910

DENVER, COL., Sept. 4—That the activities of the Denver Motor Club for the coming year may be well known before time, and to avoid conflicts, the officials of the club have announced the following contests: Two road races, one on Decoration day and the other on Labor day; reliability contest in June; gasoline economy contest in October; hill climb in November. This list is as comprehensive as possible, including all the important forms of automobile trials, and should give to the people of this section a well-defined knowledge of the cars being sold here. In addition to the above competitions, there will be considerable interest in the annual automobile show, which will be held in January or February. The preparations for these various events are under way, and some have been led to advanced stages. The show has been arranged to take place at a time when it will be possible to secure some of the exhibits from the New York exhibitions.

In the meantime, however, the club members are very busy with road and sign work, and the development of the club as a power in the State. An information bureau has been established so that local or visiting autoists may obtain correct data regarding the routes to all parts of the State. Guide books giving the directions, the distances, grades, road conditions, and legal ordinances have been prepared, and are given upon request. The membership of the organization has now passed the 550 mark.

Special interest attaches to the work for improved roads, for the Legislature has begun to realize the necessity for better highways, or rather for highways themselves. Extensive campaigns have been outlined for the building of bridges where at present none exist, and for constructing roads in several directions. The experience of the Glidden tour and the immense amount of publicity given to the fact that in some places, Colorado roads are such only on maps, has influenced many of the legislators. The Motor Club has invited the Rocky Mountain Highway Association to join hands with it in the crusade. The former is engaged at present in erecting sign boards on through routes and by the first of the year this will have been completed. The nuisance of overflowing irrigation ditches has attracted attention, and the members of the club are supplied with postal cards on which to send notice of such trouble to the club headquarters. There is a law against allowing the water to flow over the banks when such injures the public highways, and the officials in many places have been lax about preventing recurrences.

NEW AUSTIN CLUB DESIRES SANER LAW

AUSTIN, TEX., Sept. 4—With a primary object of securing more reasonable and liberal city speed ordinances, the Austin Automobile Club has been formed in this city, with about 50 charter members. A temporary organization was effected with A. C. Goeth as temporary chairman, and O. E. Millican as temporary secretary. The meeting was held in the council chamber at the City Hall, and immediately after forming, the autoists were invited to confer with Mayor Wooldridge and the City Commissioners in regard to the speed regulations.

A committee to draft a constitution and by-laws is composed of Dr. T. J. Bennett, Pierre Bremond, and H. A. Wroe. The committee which will have charge of the interests of the club along the speed legislation lines includes Frank M. Covert, E. B. Robinson, and R. M. Thompson.

CLUB FORMED IN HEREFORD, TEX.

HEREFORD, TEX., Sept. 3—The Hereford Automobile Association has been organized recently in this place with the following officers: President, W. H. Ray; vice-president, Dow Mercer; secretary, R. F. Rogers; treasurer, W. O'Brien. The purposes are declared to be to secure improved roads and sports. Efforts are being made to arrange for a fine track where automobile races might be held.

DETROIT MAKES GOOD ON 50,000 PRODUCTION FOR 1909

By LEN G. SHAW

DETROIT, MICH., Sept. 5—Nine months ago—to be exact, December 17 last—THE AUTOMOBILE published a comprehensive review of the local situation, based on a most thorough investigation, showing how Detroit, as the hub of the automobile industry, would produce 50,000 cars in 1909.

How well that prediction was fulfilled furnishes interesting reading at this time, when several of the local factories are practically cleaned up on their 1909 output, and in at least one instance, 1910 models have been on the market for two months, or, strictly speaking, have been delivered to customers for that length of time.

The statement that Detroit would produce 50,000 cars was greeted by many with derision; and not without a show of reason from their point of view. It was argued that such a feat would be a mechanical impossibility. Time was when it would, but that day is past, never to return. Many, who had been content to regard with wonderment an annual output of from 500 to 1,000 cars per factory, insisted that such increases as talked of came only with an aggravated attack of automobilis, or was the emanation of a publicity man's fancy run wild. Others, some of them experienced men, looked askance at such figures, and said that if factory managers lived up to predictions, storage space would be in great demand, with a sufficient number of cars left on hand to meet all requirements for years to come.

They were wrong. Detroit not only fulfilled the predictions made by THE AUTOMOBILE but will exceed the aggregate given by a considerable amount, and local manufacturers are preparing to perform even greater wonders next season. Furthermore, the entire output is disposed of, and in a majority of cases every energy has been directed toward keeping up with a demand that taxed every facility to the utmost.

In reviewing the situation and showing what has been accomplished, it is well to take the figures appearing in THE AUTOMOBILE last December and supplement them with the actual output.

Taking the factories in the order enumerated, the first column of figures showing the makers' plans, the second the estimated production by THE AUTOMOBILE, and the third what has actually been accomplished, or will be by January 1, gives these results:

	Makers' Plans	Estimated Production	Actual Production
Ford	25,000	20,000	20,000
E.-M.-F.	12,000	8,000	10,000
Cadillac	10,000	9,000	9,000
*Blomstrom (Gyroscope)	5,000	2,500	500
Chalmers-Detroit	3,000	3,050	3,100
Brush	3,000	3,750	3,000
Packard	1,500	2,000	2,303
Regal	2,000	1,000	1,500
Herreshoff	500	350	500
†Hudson			
†Hupmobile			

*Estimated.
†Not in existence when December computation was made.

In the foregoing table it will be seen that there are several variations alike from the manufacturers' plans and the estimated production, although in the aggregate the latter is remarkably accurate. It will also be observed that, with two exceptions, the actual production is equal to or in excess of the estimate.

The Blomstrom Gyroscope, a new proposition, was handicapped in several ways. Just how many machines will be produced during 1910 cannot be determined at this time, owing to impending changes in management and the probable removal of the business to another city.

The other concern which fell below the estimate made by THE AUTOMOBILE was the Brush Runabout Company. That was due to the liberality of the investigator, who added 750 cars, rather than to any failure of President Frank Briscoe's plans or lack of popularity on the part of the car.

"We planned to produce 3,000 runabouts, and that is the number we will actually turn out," said Mr. Briscoe. "We couldn't have made any more, no matter how urgent the demand. We have worked to the limit of our present capacity. Next year we will more than double this ouput. We are contracting for materials for 6,000 runabouts, hope to make 10,000, and will probably turn out at least 8,000. Our 1909 business is practically all cleaned up, and the 1910 models, involving no marked changes, will be coming through early in November."

In support of Mr. Briscoe's statement regarding next year's output is the fact that work has been begun on a new plant that will when completed treble the present facilities.

The Ford plant at the end of 1909 will have turned out 20,000 of the popular-priced cars, a record that will probably stand for some time as remarkable in automobile production. The factory that was supposed would be ready for occupancy February 1 is not yet fully in commission. An addition is being erected, and other buildings are under consideration. The new factory will be in commission late this fall.

At the present factory 450 cars are coming through each week. This is an average of seventy-five a day, all the plant can handle. Out at the new factory it is claimed that it will be possible to put 1,350 cars through in a week if desired. These are astounding figures. Two hundred and twenty-five cars in a working day of ten hours means that a completed automobile will be turned out every two and one-half minutes.

Next door to the Ford factory, the E. M. F. Company, in point of age still in its swaddling clothes, but in reality the liveliest infant of them all, is doing things that have caused the trade at large to sit up and take notice. General Manager Walter E. Flanders denies any knowledge of the existence of a dull season in the automobile business.

"There will always be an abnormal demand for cars in the spring," said Mr. Flanders, 'but to the live manufacturer the rest of the year is going to be good. The trouble with some concerns in the past was that as soon as the weather began to warm up, the sales department got lazy and decided to suspend operations for the rest of the summer. The manufacturer was to blame, too, for just about the time the factory should have been straining every energy to keep up with the demand he began shouting so loud about 'next year's model' that prospective purchasers decided they would wait and see what the new wonder was like, instead of investing in a car that, according to the manufacturer's own admission, would be a back number the following season. Now they're bringing out a good model and sticking to it. What's the result? Last month we shipped 1,100 cars, and we're going to keep right on doing the same thing month after month, except that next year—not next season, mind you, for it's an all-the-year-'round season with us—we will be making more cars than ever before."

By the end of the present year 10,000 E. M. F. "Thirties" will have been turned out and disposed of. Next year, according to Mr. Flanders, 30,000 to 32,000 cars will be turned out. Of this number 15,000 will be "Thirties." The rest, somewhere between 15,000 and 20,000, will be the Studebaker-Flanders "Twenty," a new Flanders creation, a four-cylinder car selling at $750, that will make its appearance the latter part of the present year. In anticipation of increasing demands, the E. M. F. plant is being increased in size nearly one-half. The new car will be made in a separate plant, located in another part of the city, where the present equipment is being increased to a point that will render possible the production of the estimated number of cars.

The Cadillac "Thirty," picked as one of the year's winners, more than fulfilled expectations. By the end of 1909 fully 9,000 of these cars will have been placed on the market, representing all that could be done and Cadillac quality be maintained. Henry M. Leland, who is in direct charge of the mechanical department, receiving his schooling in the old days when the apprentice, who finally became a journeyman, knew his trade from

beginning to end and backward. It is not enough to be up with the times. Mr. Leland and his associates believe in keeping a little ahead, and as a result every device that counts for accuracy or a saving of time without impairing results is to be found here. Since last fall the Cadillac has been running a night shift, and the plant's capacity in the matter of output has just about been reached. While not caring to venture a prediction as to next year, the Cadillac people are planning to duplicate this year's performance, and a little more, if possible.

If the Packard people have any weakness, it is a leaning toward conservatism in the matter of predictions. A year ago in answer to an inquiry the anouncement was made that in the neighborhood of 1,500 cars would be produced for 1909. As a matter of fact, that figure was exceeded by exactly 803, the last of the 1909 Packards to leave the factory being 2,303. There was just one reason that could be assigned for this increase—the ability of the factory to turn out that number and maintain the Packard standard. The thorough-going methods that have made the Packard famous wherever automobiles are known have a tendency to limit production. This is not without its advantages, for with a car of such recognized excellence and a limited production, it follows that the person desirous of securing one places his order in good season. However, General Manager Waldon would in any event have no difficulty in disposing of the entire output, and it is a knowledge of this fact, together with a desire to meet the constantly increasing demands without sacrificing a single iota in quality, that is causing the company to prosecute building operations on a hitherto unheard-of scale. This increase in facilities played an important part in enabling the Packard company to turn out 1,502 "Thirties" and 801 "Eighteens" during the year. Further additions now under way or contemplated will make it possible to produce approximately 3,000 machines during 1910. As a matter of fact, deliveries on next year's cars began early in July, and between 700 and 800 have already been sent out.

The Chalmers-Detroit is another concern that more than lived up to expectations, exceeding the mark set a year ago by 100 cars. It took that many more "Forties" than originally planned to meet the most pressing demands, bringing the year's total up to 3,100. Of this number 2,500 were "Thirties" and 600 "Forties." The original building of the present plant contained some 72,000 square feet of floor space. Machinery is just being installed in a new four-story building having 96,000 feet of floor space, and work is in progress on a third of like size that will be ready for occupancy by winter—November 15, the contractors say. This will give the Chalmers-Detroit company the room it has long needed, and accordingly 5,250 cars have been contracted for for 1910.

The Regal split the difference between the makers' plans and estimated production, the fifteen hundredth car winding up the season, being shipped September 1. This is a highly creditable showing when the handicap in the way of factory room under which the Regal people labored is taken into consideration, and the popularity of the car is demonstrated by the early cleanup. For 1910 the company plans to build 5,000 cars. There is no apparent reason why it should not succeed. Three times the present floor space will be available because of new buildings that are going up, and at all events this year's output will be greatly increased.

By the end of January, which closes the factory year at that plant, 500 of the Herreshoff cars will have been placed on the market, according to Charles F. Herreshoff, president of the company, and who is in direct charge of affairs. For a time considerable delay was experienced in getting motors, of Mr. Herreshoff's own design, but that difficulty has been obviated and everything is running smoothly. For 1910 a like number of cars will be produced, according to present plans. In this connection comes the interesting announcement by President Herreshoff that next year's sales will be handled direct from the factory, instead of through a middleman, as was the case this season. Harry Houpt, who controlled the entire output this year, may continue to handle the car in New York, but the rest of the country will be cared for by the company direct.

Two concerns that did not figure in last December's computation, not being in existence at that time, are looming strong above the horizon, and have already succeeded in materially swelling the total output of Detroit's factories. These are the Hudson Motor Car Company and the Hupp Motor Car Company.

The former is located in the old Northern plant, which is well adapted to its purposes, and where cars are being turned out at a lively rate. The fact that operations were begun only a few months ago means little in this case, as with such experienced men as Hugh Chalmers, R. B. Jackson, F. O. Bezner, Howard E. Coffin and others identified with it, the company is in reality as well off as the average veteran. The advent of the Hudson "Twenty," which is listed at $900, was the signal for a rush on the part of dealers, and it is asserted that the entire year's output was contracted for three weeks after the first announcement. By January 1 next, according to present calculations, 2,500 "Twenties" will have been turned out. What next year may bring forth is not disclosed, those in charge preferring to await developments. However, in anticipation of an increased demand plans have been made for enlarging the factory's capacity.

Although the Hupp Motor Car Company did not get under way until last March, the end of 1909 will, according to Vice-President R. C. Hupp, find 2,500 of the little cars on the market. The chief difficulty experienced by the company has been in filling orders. Trouble from this source will from now on be eliminated, the concern having just moved into a new factory on Jefferson avenue that will prove adequate for a long time.

"We will build 5,000 cars next year," is the prediction of Vice-President Hupp. "In general lines the 1910 model will differ little from our this year's car. It will contain numerous refinements, however, and be even better than the original model."

Taking the foregoing figures, and in each instance applying the minimum selling price, it will be found that Detroit's contribution in the way of automobiles for 1909 possesses an aggregate sale price well in excess of $52,000,000. When it is further stated that the coming year will probably see the addition of a half dozen large automobile plants, one begins to understand what the automobile industry means to Detroit, or what Detroit means to the automobile industry.

Some Recent Projected Factory Plans

DETROIT, Sept. 5—Detailed plans for the immense plant of the Brush Runabout Company have just been completed. There will be four structures, including a two-story office building, 63 x 71 feet; an experimental building, 276 x 150 feet; finishing building, 208 x 150 feet, and a foundry 75 x 50 feet. The buildings will be of brick and steel, and will have all modern accessories of finish.

The Packard Motor Car Company has just let contracts for an additional office building, 508 x 60 feet, to be erected in connection with its plant at Grand boulevard and the Belt Line.

The Michigan Auto Parts Company will build a factory addition one story in height and 168 x 71 feet on the ground adjoining its present plant at Jefferson and Campbell avenues.

This showing for a single week, coupled with the fact that nearly every other automobile factory in the city is engaged in increasing its capacity, indicates that manufacturers are not only satisfied with present conditions but have confidence in the future.

Another Newcomer to Hail from Detroit

DETROIT, Sept. 7—The Krit Motor Car Company is the latest addition to the local automobile colony, articles of incorporation having just been filed. The company is capitalized at $100,000, of which $50,000 is subscribed and $23,000 paid in in models, specifications, machinery and completed cars. A four-cylinder car designed by Kenneth Crittenden will be manufactured and marketed. It is announced that a factory capable of turning out 2,500 cars a year will be erected.

NOVEL DECORATIONS FOR PALACE SHOW

Something entirely new in decorative effect will be witnessed at the opening of the Tenth International Automobile Show in the Grand Central Palace, New York City, on New Year's Eve. A trellis garden scheme, with lattice work intertwined by myriads of electric lights and huge fire balls, landscape effects, pictorial scenes, and floral designs, will be included in the materials which will absolutely transform the big building. At the recent meeting of the show committee, of which R. E. Olds is chairman, representing the American Motor Car Manufacturers' Association, the Importers' Automobile Salon, and the Motor and Accessory Manufacturers, it was decided to award the contract to Unitt and Wickes, of New York. It was this firm which presented plans for the trellis garden.

From the front door to the rear will be in the hands of this firm of decorators, beginning with a handsome porte-cochere outside of the building, of a different design from the one used last year. At the back of the main hall will be erected gigantic French glass mirrors, in front of which will be an electric fountain, and between these two will be the bower. The garden influence will permeate everything, even to the furniture in the exhibition spaces. The concern which has this in charge is a leader in this kind of work in this country, its latest success being in the construction of the mammoth roof garden on the Hotel Astor. It promises that the plans and models, which indicate schemes entirely different for the Palace from anything before attempted in connection with automobile shows, will be definitely carried out. As formerly the active management of the show will be under the personal supervision of Alfred Reeves, the general manager of the association.

BRUSH SUCCESSFUL IN RURAL MAIL WORK

OTTAWA, KAN., Sept. 4—With the growth of the rural mail service has come the usurpation of the horse delivery by that of the automobile. W. A. Johnson, of this place, recently purchased a Brush runabout with which to cover his 25-mile route. He has to make daily trips through the rough and hilly country west of here, and with his horse and carriage it was the work of an entire day, with 84 mail boxes to be visited. He has had the Brush some time now, and does the entire circuit in three hours with ease. The outlay for the Brush was $610, only a little more than was necessary for three horses and wagon, which was the equipment needed before. Mr. Johnson keeps a close account of his expenses, and finds that it is costing him at a rate of $61.80 a year for the maintenance of the car, and his entire repairs have amounted to less than $10, even when he was engaged in learning to operate it.

PACKARD CAPITAL NOW $10,000,000

DETROIT, Sept. 7—The Packard Motor Car Company, organized eleven years ago under the laws of West Virginia, is now a Michigan corporation, articles of association having been filed at Lansing September 1. At the same time the capitalization was increased to $10,000,000, of which $5,000,000 is preferred and $5,000,000 common stock. Increasing business made it necessary to enlarge the capital stock. Extensive additions are being made to the plant to enable the company to avoid night work, it being the desire of President Henry B. Joy and his associates to make it a strictly daylight factory.

ELKHART CARRIAGE MAKERS ENTER TRADE

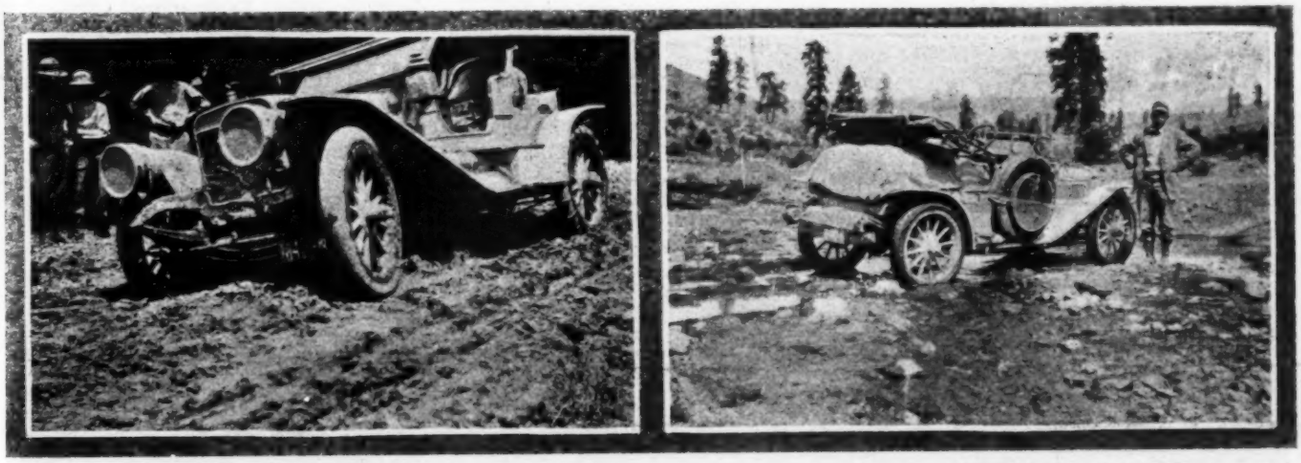
ELKHART, IND., Sept. 6—The Elkhart Carriage & Harness Manufacturing Company has decided to enter the automobile field and has drawn up plans for its product. The car will have a motor of from 30 to 35-horsepower, with the engine, clutch, and transmission in a unit. The rear axle will be full floating, with the housing of pressed steel, the wheel base 117 inches, and the wheels 24 inches in diameter. Three styles of bodies will constitute the line, the standard five-passenger touring car, the baby tonneau, and the roadster. The first lot of machines will be ready for exhibition purposes during the early part of October.

SMITHS RETIRE FROM OLDS MOTOR WORKS

DETROIT, Sept. 6—Bentley J. Mead, general sales manager of the General Motors Company, is the new secretary and general manager of the Olds Motor Works, Lansing. Frederick L. Smith, vice-president and general manager, and his brother, Angus, secretary-treasurer of the Olds company, have resigned, and the duties of secretary and general manager have been assumed by Mr. Mead, who is regarded as direct representative of the General Motors Company, which recently acquired the Olds plant.

Announcement of the change came as something of a surprise, but directors of the company decline to discuss the matter, while both the Smiths, who are well known in the automobile world, refrained from commenting on the situation further than to state they had other plans in view that would occupy their time fully.

It is understood that the Smiths are interested in the organization of a new automobile company, to be promoted by Ralph R. Owen, who has resigned as factory manager for the Olds company, although he will have no active part in the management. There is a strong likelihood, in case the deal goes through, that the plant will be located in Detroit.

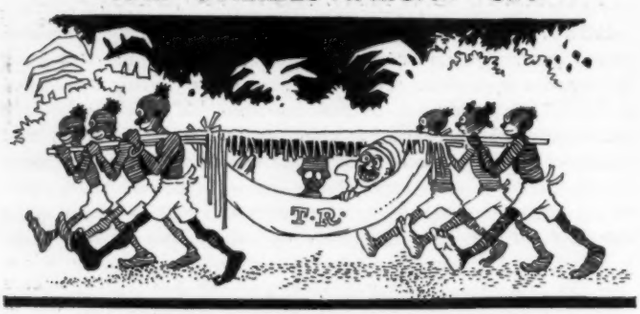


What Mr. Selby's Winton Found in Town of Casey, Ill. Near Ellensburg, Wash., Roads at Least Had Foundation

Where the Roads in Town Were Somewhat Inferior to Traveling in the Open Country

Mr. and Mrs. W. G. Selby, of Marietta, Ohio, have arrived at Seattle in their Winton Six, having taken 29 days for their overland journey from Pittsburg to the exposition city. On the trip Mr. Selby states that he cleaned one spark plug; otherwise the motor never gave him a moment's thought. From Seattle, Mr. and Mrs. Selby will tour to Los Angeles and thence home via Salt Lake City

"T. R." UTILIZES AFRICAN "SIX"



From the "Auto Era," Published by Winton Motor Carriage Co.

NEW YORK Y. M. C. A. OPENS AERO SCHOOL

To meet the prospective demand for men trained in the various branches of aeronautics the New York West Side Y. M. C. A. is to conduct an evening course in that science, under the direction of Wilbur R. Kimball, of the Aeronautic Society. This school owes its existence to an experimental course of lectures given last winter by Cortlandt Bishop, Augustus Post, W. E. Scarritt, and others. The course will be principally devoted to aeroplanes, as these are believed to be susceptible of the most development in the future. Much of the equipment of the automobile school already conducted by this organization will be used in the new school. No actual practice in aviation is at present contemplated, but this feature may be added.

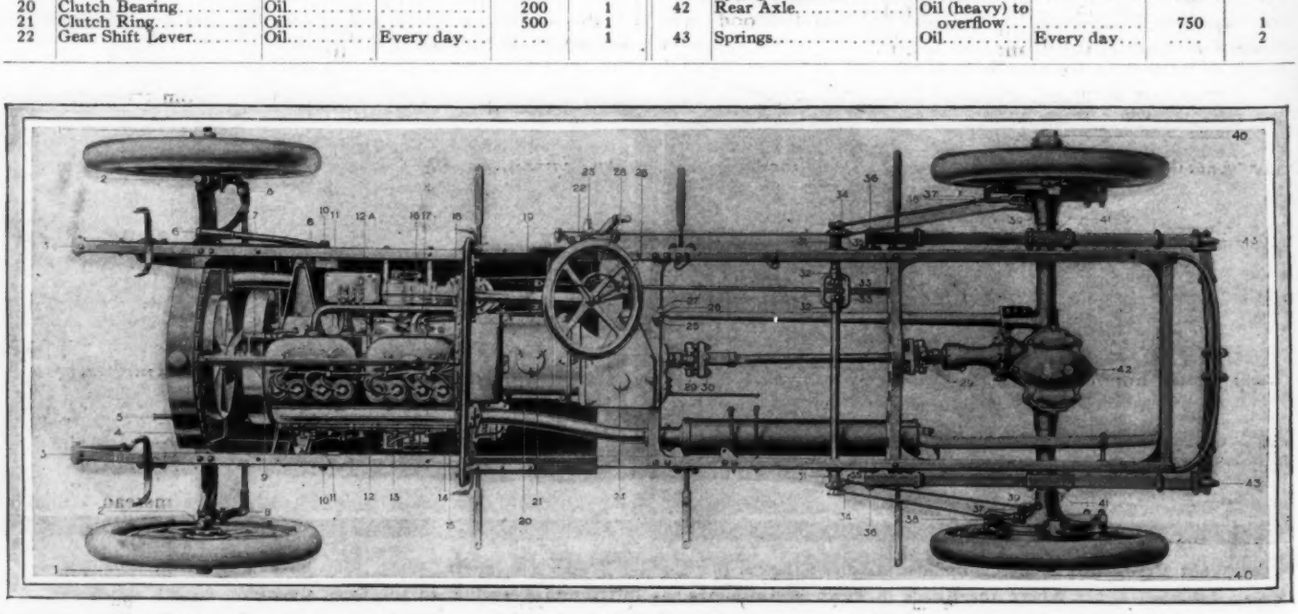
WARNER ORGANIZES NEW GEAR COMPANY

TOLEDO, O., Sept. 4—T. W. Warner, formerly of the Warner Gear Company, of Muncie, Ind., has organized the Warner Mfg. Co. in this city to make change-gears, differential and steering gears. At present the company is located in the old Pope-Toledo plant, in buildings rented from the Overland Automobile Company, which is one of its largest customers, and is employing 200 men. This arrangement is only temporary, however. Mr. Warner says that he will build a new plant either in Muncie, Ind., Toledo, or Detroit, to be finished within three months.

INSTRUCTING OWNERS IN CARE OF CARS

Admittedly the greatest obstacle to securing possibilities of efficiency and long life, which are latent in almost every automobile, is the indifference and neglect of the operator; and, further, that neglect has its most immediate and far-reaching influence when it affects the lubrication. Few drivers are so criminally careless as to forget to replenish the mechanical oiler and crank-case supply, and most of them refill the gear-box and the rear-axle casing occasionally; but the many small oil holes and grease cups, which of necessity must be scattered over the chassis, are too frequently neglected. As a reminder to owners and chauffeurs of their duty in this respect, the Stevens-Duryea Company has included in its instruction book a double-page plan view of the chassis, with all oil holes and grease cups indicated by arrows and reference numbers, and a table to correspond showing the intervals at which each should be given attention. The illustration is so clear that the veriest novice could not go wrong.

No.	Parts	Lubrication	Give Attention	Miles	No. of Places on Chassis	No.	Parts	Lubrication	Give Attention	Miles	No. of Places on Chassis
1	Front Hubs	Grease		1,000	2	23	Emergency Brake Lever	Oil	Every day	....	1
2	Steering Knuckles	Grease		200	2	24	Transmission	Oil (heavy-1" deep in case)		....	..
3	Springs	Oil	Every day	....	2	25	Torsion Rod Spring	Oil		300	1
4	Carbureter Primer	Oil	Every day	....	1	26	Torsion Rod Bearings	Grease		300	1
5	Starting Handle	Oil	Every day	....	1	27	Torsion Rod Bearings	Grease		300	1
6	Steering Rod	Oil	Every day	....	2	28	Ball Joints	Oil		200	2
7	Fan Support	Oil		300	1	29	Universal Joints	Grease		250	2
8	Tie Rod	Grease		200	2	30	Sliding Joint (Universal)	Grease		250	1
9	Fan Bearings	Grease	Every day	....	1	31	Brake Bearings	Oil		200	2
10	Springs	Oil	Every day	....	2	32	Brake Rods	Grease		300	2
11	Springs	Oil	Every day	....	2	33	Brake Equalizer	Oil		300	2
12	Valve Tappets	Oil	Every day	....	8	34	Brake Rod Ends	Oil		200	2
12A	Rocker Shaft	Oil		300	4	35	Brake Rod Ends	Oil		200	2
13	Magneto	Oil (light)		500	2	36	Springs	Oil		200	2
14	Magneto Connection	Oil	Every day	....	1	37	Brake Arm Bearings	Grease		200	2
15	Magneto Bearings	Grease		200	1	38	Brake Rod Arm Ends (upper and lower)	Oil		200	4
16	Steering Post	Grease		750	1	39	Brake Rod Ends	Oil		200	2
17	Timer	Oil	Every day	....	1	40	Rear Hubs	Grease		1,000	2
18	Steering Post	Oil		200	1	41	Spring Seats	Grease		200	2
19	Clutch Bearing and Brake Pedal	Oil		200	2	42	Rear Axle	Oil (heavy) to overflow		750	1
20	Clutch Bearing	Oil		200	1	43	Springs	Oil	Every day	....	2
21	Clutch Ring	Oil		500	1						
22	Gear Shift Lever	Oil	Every day	....	1						



Chassis of Stevens-Duryea "Four" with Parts Numbered, to Be Used with Lubricating Table Printed Above

Told in the Progress of the Industry

Timken Company Host of Factory Organization—To show its appreciation of the manner in which its factory organization has responded during the formative period of the new plant, the Timken-Detroit Axle Company last Saturday acted as host. The factory employees were given a yachting party to Wolf's Point, Can., and a dinner there, after athletic sports. In the evening the commercial department and the heads of the several branches of the big industry were tendered a banquet at the Hotel Tuller. The celebration was over the remarkable showing that has been made by the officers and men of the concern in building up the present axle business since July 6. On that date the Timken Roller Bearing Company, of Canton, moved its axle plant to the City of the Straits, a new factory was started, an organization perfected, and deliveries made on contract time.

What it Costs to Guarantee Studebaker Cars—A question which has agitated the minds of many manufacturers of automobiles is that of the cost of guaranteeing the products. The standard warranty of both national organizations covers only 60 days, for defective workmanship or material. One of the concerns which has guaranteed its output for a year is the Studebaker Automobile Company, and a recent appraisal was made of the cost of this service. It has marketed 1571 Studebaker-Garford chasses, and the company has been extremely liberal in carrying out its promises. It came as a surprise, therefore, when it was learned that from March, 1905, to October, 1908, there had been expended a sum of $16,620.18 for the guarantee. This is an average of but $10.51 a car.

Fisk Tires Tested in Transcontinental—The worth of Fisk tires was recently shown in a double transcontinental tour, according to the information given by the Fisk factory. The tour was one made by Everitt Mead and A. Newton Mead, of Greenwich, Conn., in a Packard car, and 10,185 miles were covered. Leaving the East on May 19 they traveled overland with several makes of tires on the machine during the journey. At Los Angeles, they put a new Fisk on a rear wheel, and reached New York with the Pacific air still in it, not a puncture nor blowout having been experienced upon that wheel. The return trip included a long stretch of 1,600 miles to Seattle, over the Mount Shasta route, and the Siskiyou Mountains, before turning eastward over the Rockies and the great plains.

What Color for Municipal Automobiles?—This important question was a ponderous and facetious one in Boston recently, for an ordinance to prevent joy rides in the city's cars was passed. It required that the machines be painted a standard color, and that they bear the name of the city and the department on the side. The Mayor's cabinet first attempted to decide upon the color, but agreed to leave that matter to the art department. One man wanted Harvard crimson, another voted for pale lavender, another for crushed strawberry, and still another for lemon. The Mayor, however, decreed that the fire department might retain red on its autos, but suggested that the others be colored a standard black like his own.

Ajax Tires Score at Lowell—In the Merrimac Valley trophy contest of the light cars at Lowell, Mass., on Monday, the Ajax tires again made a splendid showing. They were used by the three Maxwell cars which finished second, third, and fifth, driven respectively by See, Costello, and Sickinger. These men drove the machines for 127 miles at high speed without a puncture and, according to the Ajax officials, were not handicapped with tire trouble of any sort. This showing is a repetition of the Ajax success at Savannah last year.

Will Exhibit Firestone Cars—The Columbus Buggy Co., of Columbus, O., is arranging to have large exhibits of its new gasoline cars at the approaching automobile shows. The firm is manufacturing the Firestone cars and the 1910 models are expected to be out in about 30 days. The machines at Atlanta will be in charge of L. E. Key. New York and Chicago are also on the list.

Another Carriage Maker in Line—The United States Carriage Co., of Columbus, O., has announced its intention of joining the manufacturers of automobiles and will have a four-cylinder gasoline car for sale next season. The line will consist of touring cars, runabouts, hearses, cabs and ambulances. It is expected that the first of the production will appear early in January.

Minneapolis Gets First Taxicabs—Minneapolis recently received its first taxicabs, and they are now upon the streets giving excellent service to a growing patronage. The McAllister & Newgord Co. introduced this method of transportation with 15 Fords, and it is understood that the Pence Automobile Co. will soon have 25 cars on the streets also. At present there is room for all comers.

Credit for Knox Photograph—The picture of the Knox car which won the 50-mile free-for-all on the Galveston Beach, as shown in last week's AUTOMOBILE, on page 413, should have been credited to C. C. Burns, who took it.

IN AND ABOUT THE AGENCIES

Pence Auto Company, Minneapolis, Minn.—One of the largest and handsomest buildings in this country devoted to the automobile trade has been opened by the Pence Auto Co. in Minneapolis. It is an eight-story structure of fireproof construction and with all the conveniences for garage, repair and selling work. The location at Hennepin and Eighth streets is almost in the center of the business section. The company was started in 1903 by H. E. Pence with a capital of $2,200, and its rapid rise can be imagined from the fact that the cars sold last year were valued at nearly $2,000,000. For the 1910 season, 3,750 machines have been ordered for the firm's territory, which includes this State, the Dakotas, and Montana.

Palmer & Singer, Philadelphia—The agency for the Palmer & Singer cars has been placed under the management of George P. Parker. Options have been secured on several Row locations and one will be selected shortly.

Morgan & Wright, Minneapolis, Minn.—The Minneapolis branch of Morgan & Wright, makers of the famous "Good Tires," was moved on September 1 to new and more commodious quarters at 911 First avenue, South.

RECENT BUSINESS CHANGES

Fort Worth Agencies Consolidate—Three automobile agencies in Fort Worth, Tex., were consolidated recently when W. J. Tackaberry and S. R. Wells, of the Runnells Automobile Company, sold their interests to E. P. Reynolds. The firm will hereafter be known as the Runnells & Reynolds Auto Company. E. F. Simmons is also connected with the concern, thereby bringing in the agency for the Stevens-Duryea. Five makes of cars will be handled, as follows: Chalmers-Detroit, Hudson, Stevens-Duryea, Ricketts Six and Regal. It is very probable that a couple of other lines will be added, in order to give a complete list of lines selling from $650 to $6,000.

Minneapolis Knox Agent Incorporates—The Mich Automobile Company, which has had the agency for the Knox cars in Minneapolis, has filed articles of incorporation, with a change of name. It will hereafter be known as the Mich-Stair Auto Company, with a capital stock of $50,000, W. A. Stair having joined as a partner. A new building will shortly be erected at First avenue and Eighth street, and other lines of cars added to the present one.

Morgan & Wright, Los Angeles, Cal.—The Los Angeles branch of Morgan & Wright, the manufacturers of M. & W. tires and rubber goods, was moved on September 1 from 118-122 East Tenth street to more commodious quarters at 1108 Main street. It now has greatly improved facilities for handling the trade, which is showing a healthy growth.

Tray Plate Battery Company Moves—The Tray Plate Battery Company, Binghamton, N. Y., has recently moved into its new large plant on Wall street. It is preparing for an increased campaign with the well-known "High Efficiency" non-sulphating batteries.

PERSONAL TRADE MENTION

E. LeRoy Pelletier has been appointed general advertising manager of the Studebaker Automobile Company and the Studebaker Bros. Manufacturing Company. He will have his headquarters at South Bend, Ind., instead of with the Studebaker E-M-F factory in Detroit. In his new capacity Mr. Pelletier will have full control of the advertising of the Studebaker horse-drawn vehicles as well as of the entire automobile business, which formerly was his special province.

S. W. Rushmore, of the Rushmore Dynamo Works, and Mrs. Rushmore, have recently sailed for Europe on the Mauretania. They will make a tour of six weeks' duration, during which time Mr. Rushmore will establish a branch in Berlin, where the Rushmore lights and generators have had a greatly increasing sale. The existing branches in London, Paris, and Milan will also be visited.

Len Zengle, the crack Chadwick driver who has been so successful recently in hill climbs and at Indianapolis, will shortly return to the Pennsylvania Motor Works factory at Bryn Mawr, Pa. He will, however, fill all of his driving engagements with the Chadwick Company until the close of the season.

Leon M. Bradley has been selected as manager of publicity for the Atlanta automobile show, which will be held in that city from November 6 to 13. Mr. Bradley retains his connection with the A. M. C. M. A. at the same time.

George S. Atwater, formerly with the Atwood Manufacturing Company, is now associated with the Tray Plate Battery Company, of Binghamton, N. Y. He will represent them in their sales department.

OBITUARY NOTICE

Edward M. Murphy, pioneer vehicle and automobile manufacturer, died suddenly of apoplexy at his home in Pontiac, Mich., on September 4. In 1887 Mr. Murphy settled in Pontiac, and the following year, with C. V. Taylor, organized the Pontiac Buggy Company. He was one of the organizers of the Oakland Motor Car Company and a stockholder in several other carriage and automobile concerns.

NEW AGENCIES ESTABLISHED

Marmon and Parry: Minneapolis, Minn.—Fawkes Auto Company, in addition to the American, Overland, Reo and Holsman.

Continental Tires: Milwaukee, Wis.—Welch Bros. Motor Car Company, Grand avenue and Seventh street. For eastern Wisconsin.

Haynes: Houston, Tex.—Mosehart & Keller Automobile Company, for Texas, Southern and Western Louisiana.

Velie and Hupmobile: Cincinnati—Evanston Automobile & Garage Company, 3705 Main avenue.

Stevens-Duryea: Pittsburgh—E. O. Vestal, The Rittenhouse, North Highland avenue.

Winton and Regal: San Antonio, Tex.—C. H. Dean, 234-238 South Flores street.

Haynes: Greenville, S. C.—B. W. Martin, for Greenville and adjoining counties.

Regal: Greenville, S. C.—W. H. Irvine, Jr., for Northwestern South Carolina.

Studebaker: Roanoke, Va.—Valley Motor Vehicle Company, Limited.

Detroit Electric: Mineapolis, Minn.—Hathaway-Stimson Company.

Stevens-Duryea: Minneapolis, Minn.—M. R. Waters & Sons.

White: Sioux City, Ia.—Bennett Auto Company.

Empire: Minneapolis, Minn.—Maxfield Auto Company.

Overland: Tampa, Fla.—Hobbs & Knight Company.

Croxton-Keeton: Pittsburgh — Fred W. Fischer.

Franklin: Baltimore—Mar-Del Mobile Company.

RECENT INCORPORATIONS

Harper Livery & Sale Company, Salisbury, N. C.—Capital $50,000. To operate livery and sale stable with privilege of operating automobile lines in the State. Officers: President, J. P. Harper; vice-president, J. D. Heilig; secretary and treasurer, M. J. Ragland.

E. R. Thomas Motor-Branch Company, Boston—Capital $100,000. To deal in automobiles. Officers: President, E. L. Thomas; secretary and treasurer, J. M. Edsall; manager, C. S. Henshaw. Temporary offices at 288 Columbus avenue, Boston.

Citizens' Automobile Company, Birmingham, Ala.—Capital $25,000. To manufacture, sell, and lease automobiles, taxicabs, and auto accessories. Incorporators: J. C. Turner, M. F. Hinckman, H. G. Robinson, G. W. Yancey.

Trackless Trolley Company of America, New York—Capital $150,000. To manufacture automobiles, motor vehicles, bicycles and other vehicles. Incorporators: C. E. Barrett, A. L. Newman, Sadie Wiener.

Victor Windshield Manufacturing Company, Chicago—Capital $2,500. To manufacture windshields and automobile accessories. Incorporators: J. McGaffey, A. L. Haake, S. S. Gorham.

Hazard Engineering Company, Gates, N. Y.—Capital $100,000. To manufacture automobile and marine gasoline engines. Incorporators: E. C. Hazard, G. E. Hazard, W. J. Robinson, J. Bennett.

Automobile Service Company, Camden, N. J.—Capital $50,000. To operate taxicabs and automobiles for public use. Incorporators. F. R. Hansell, W. F. Eidell, John A. MacPeak.

Rainier Motor Truck Company, New York—Capital $50,000. To manufacture motor trucks for freight only. Incorporators: P: N. Lineberger, G. C. Comstock, J. T. Rainier.

Fox-Stiefel Company, New York—Capital $130,000. To manufacture and deal in goods for automobilists. Incorporators: T. F. A. Gibney, H. A. Herold, Simon Wickes.

Kemezite Company of America, New York—Capital $10,000. To manufacture and sell kemezite. Incorporators: L. W. Lisberger, Joel Jacobs, Edward B. Levy.

American Automobile Company, St. Joseph, Mo.—Capital $25,000. To deal in automobiles. Incorporators: W. G. Campbell, John F. Garber, C. R. Vaughn.

Elizabeth Taxicab Company, Elizabeth, N. J.—Capital $100,000. To manufacture automobiles. Incorporators: F. N. Voorhees, W. H. Cole, F. V. Price, Jr.

Franklin Square Garage Company, Worcester, Mass.—Capital $35,000. To do a general automobile business. President and treasurer, A. R. Davis.

Ranger Automobile Company, Chicago—Capital $25,000. To manufacture automobiles. Incorporators: G. A. Schmitt, E. A. Sanders.

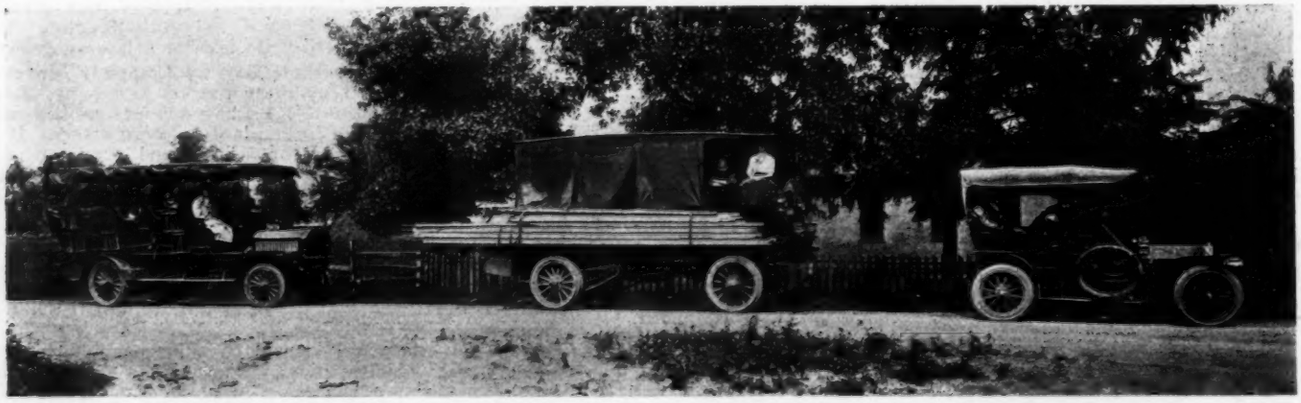
Ewing Automobile Company, Cleveland—Capital increased from $150,000 to $175,000.

RECENT PUBLICATIONS

Stewart & Clark Manufacturing Company—Stewart speedometers for 1910, with all the improvements considered in detail, and the entire construction of the instruments explained, are well taken up in the new catalogue, just issued. This book of imposing size, beautifully printed, with exceptionally clear photographs, is the foreword of the Chicago concern, and the news it contains is of special interest to owners and dealers alike. In regular order the type of instrument is explained, and the principles of the operation of the multipolar action shown, as compared with other types, before introducing the new models themselves. Twenty-one different styles of speed recording instruments will be manufactured, and the new factory has a capacity which would supply a speedometer for every automobile built within the next 365 days. The long list includes those for automobiles, motorcycles, and motorboat engines. Of course, the majority are for the autos and are constructed to read mileages from zero to 90, with some stopping at intermediate points, such as 50, 60, and 75. A great deal of attention has been given during the preparation of the 1910 product to the fittings which go with them, such as dash brackets, electric lights, swivel joints, and wheel clamps, and improvements made in them all. The book is printed in two colors, orange and black, so that the subjects being discussed are well set out. It is bound in heavy stock.

Winton Motor Carriage Company, Cleveland—The Winton Six Upkeep Book, the second annual edition, has been issued to show the records of the Winton cars winning prizes for low cost of maintenance. The booklet is very artistically compiled, and the statements of the judges and of those who won are very interesting. That a car can be driven for 17,003 miles without a cent being paid for repairs is wonderful. Other sets of figures are of equal importance. In each case of the ten, the details of the records kept for eight months are given, sworn to by both the chauffeurs and owners. It is especially noteworthy that the first three prize winners this year were not new machines, and these facts are well brought out in the edition. Announcement is also made in it of a continuance of this novel competition.

The Autolight & Motor Supply Company, Philadelphia—This large, thick catalog will be a delight to every automobilist, as it is one of that welcome sort that is practically an encyclopedia of every accessory pertaining to the sport. The 155 pages contain descriptions and price-lists of everything from a spark-coil primary binding post washer at five cents to a 42x5 1-2 inch tire.



How an Automobile Truck Is Utilized to Transport the Ever Popular Moving-Picture Show

The truck, manufactured by John H. Blacker & Co., of Chillicothe, O., was fitted up by Albert Taylor, of Mt. Sterling, O., to carry his moving-picture show. The dynamo which furnishes the light and power for the show is driven from the flywheel of the motor. The car itself carries the tent, seats, and all other paraphernalia. After the show is over, Mr. Taylor gives his customers a ride in the sight-seeing car, which is also shown in the picture.